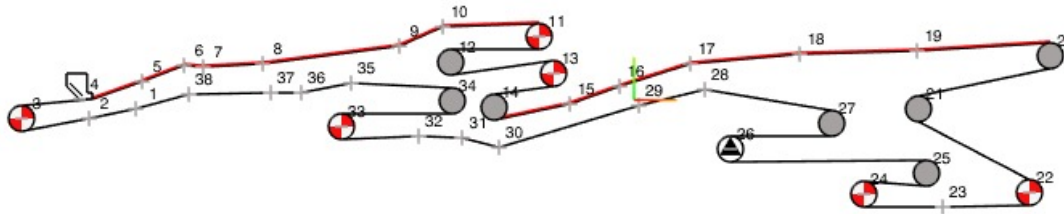


Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019



C3 Overland



Conveyor Material

Material	COAL BITUMINOUS SIZED	Surcharge Angle	10 °
Low Bulk Density	800 kg/m3	Angle of Repose	35 °
High Bulk Density	900 kg/m3	Material Lump size	250 mm

Conveyor Data

Conveying Distance	21108.81 m	Design Capacity	2500 tonnes/hr
Nett Lift / Lower(-)	71.67 m	Belt Speed	7.5 m/s

Belt Details

Belt Width	1200 mm	Calculated Belt % Full	75.55 %
Belt Class & Run Safety Factor	ST 1500 5.42	Top Cover Thickness	7 mm
Belt Rated Tension	224 kN/m	Bottom Cover Thickness	5 mm
Belt Total Length	41612.9 m	Belt Mass	30 kg

Belt Tensions and Power Calculations Visco

Effective Tens. Fully Loaded	506.64 kN	Belt Power - Empty Belt	1378.59 kW
Maximum Tension Tmax	332.28 kN	Belt Power - Inclines Loaded	3636.97 kW
Minimum Tension Tmin	62.64 kN	Belt Power - Declines Loaded	1633.32 kW
Sag Tension 2%	37.57 kN	Belt Power - Fully Loaded	3799.82 kW
Takeup Type	Vertical Gravity	Drive Efficiency	94.00 %
Takeup Mass	13000 kg	Absorbed Power Fully Loaded	4042.34 kW
Takeup Pulley Belt Tension	63.74 kN	Installed Motor Power	4250 kW

Carry and Return Idlers

Carry Idler Trough Angle	45 °	Return Idler Trough Angle	30 °
Carry Idler Spacing	5 m	Return Idler Spacing	10 m
Carry Idler No Rolls x Dia	3 x 194 mm	Return Idler No Rolls x Dia	3 x 178 mm

Dynamics and Miscellaneous Data

Startup Factor - Fully Loaded	110.00 %	CEMA Temperature Factor Kt	1
Startup Factor - Empty	50.00 %	Total Braking Torque LSS	122.10 kNm
Starting Time - Fully Loaded	432.26 sec	Stop Time - Loaded, Braking	48.09 sec
Starting Time - Empty	237.7 sec	Stop Time - Loaded, Coasting	67.65 sec

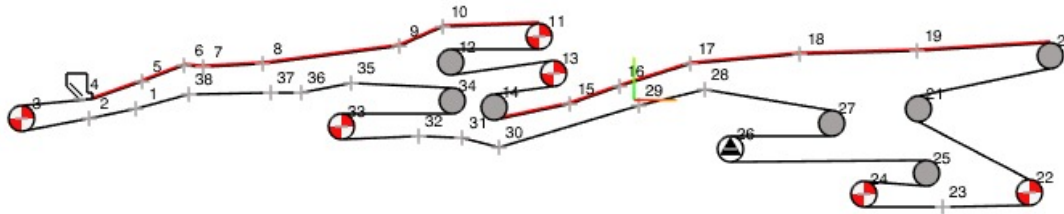
Designers Comments

C3 Overland Model - This model has been built from designs made by others and it uses very large idler spacing and pushes many design boundaries - it is shown only for purposes of showing what the Helix delta-T Software can do. The Visco calculation method can be applied here. When calculating with ISO method the ISO friction Adjustment factor of 0.75 is applied and can be seen on the Drawing Tab above the profile sketch of the conveyor.

Project Demo 12 Curragh North Overland Client
 Project No. Prepared By P Burrow
 Conveyor No. C3 Overland Design Date 01 Oct 2019



C3 Overland



Station / Section

Station	Description	Section Length m	Section Lift m	X co- ord m	Y co- ord m	Z co- ord m	Cap- acity tph	Ten Adj. kN	Idler Spacing m	Skirt Length m	No. of Scrapers	Friction Factor Input
1 Int. Pt		10.00	0.00	20.00	0.00	0.00	0		10			0.00000
2 Int. Pt		10.01	-0.53	10.00	0.00	0.00	0		10		2	0.00000
3 Drive	Tail Brake	3.48	0.47	0.00	0.00	0.00	0		0.3			0.00000
4 Hopper		1367.73	22.00	3.45	0.00	1.00	2500		5	6.00		0.00000
5 Int. Pt		459.05	-6.50	1371.00	0.00	23.00	2500		5			0.00000
6 Int. Pt		574.09	10.10	1830.00	0.00	16.50	2500		5			0.00000
7 Int. Pt		1205.07	-13.30	2404.00	0.00	26.60	2500		5			0.00000
8 Int. Pt		6818.01	9.70	3609.00	0.00	13.30	2500		5			0.00000
9 Int. Pt		588.05	-8.00	10427.00	0.00	23.00	2500		5			0.00000
10 Int. Pt		1492.04	10.61	11015.00	0.00	15.00	2500		5			0.00000
11 Drive	Tripper drv 1	17.03	1.06	12507.00	0.00	25.00	0		5		2	0.00000
12 Bend		17.03	-0.94	12490.00	0.00	25.00	0		5			0.00000
13 Drive	Tripper Drv 2	17.00	0.06	12507.00	0.00	23.00	0		5		2	0.00000
14 Bend		1024.02	6.95	12490.00	0.00	22.00	2500		4			0.00000
15 Int. Pt		2385.04	14.50	13514.00	0.00	28.50	2500		5			0.00000
16 Int. Pt		1763.00	-2.20	15899.00	0.00	43.00	2500		5			0.00000
17 Int. Pt		2643.14	13.98	17662.00	0.00	40.80	2500		5			0.00000
18 Int. Pt		450.12	-3.78	20305.10	0.00	54.78	2500		5			0.00000
19 Int. Pt		339.46	17.61	19855.00	0.00	51.00	2500		5			0.00000
20 Head		394.28	-14.94	20194.00	0.00	68.00	0		10		4	0.00000
21 Bend		25.02	1.06	19800.00	0.00	52.00	0		10			0.00000
22 Drive		5.04	0.61	19825.00	0.00	52.00	0		10			0.00000
23 Int. Pt		5.04	-0.61	19820.00	0.00	52.00	0		10			0.00000
24 Drive		7.08	-1.06	19815.00	0.00	52.00	0		10			0.00000
25 Bend		37.02	-1.06	19822.00	0.00	52.00	0		10			0.00000
26 Takeup		16.04	-1.09	19785.00	0.00	52.00	0		10			0.00000
27 Bend		55.04	-1.98	19801.00	0.00	52.00	0		10			0.00000
28 Int. Pt		523.00	0.00	19856.00	0.00	50.50	0		10			0.00000
29 Int. Pt		1671.03	-10.20	19333.00	0.00	50.50	0		10			0.00000
30 Int. Pt		1764.00	2.20	17662.00	0.00	40.30	0		10			0.00000
31 Int. Pt		4883.08	-28.00	15898.00	0.00	42.50	0		10			0.00000
32 Int. Pt		588.05	7.47	11015.00	0.00	14.50	0		10		2	0.00000
33 Drive	Return Drv	13.00	0.02	10427.00	0.00	22.50	0		10			0.00000
34 Bend		6830.01	-11.15	10440.00	0.00	23.50	0		10			0.00000

26 Jun 2020

Conveyor Sections - Input Data

Helix Technologies Pty Ltd

Page: 3/66

Project

Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

Conveyor No.

C3 Overland


Design Date

01 Oct 2019

Station / Section		Section Length m	Section Lift m	X co-ord m	Y co-ord m	Z co-ord m	Capacity tph	Ten Adj. kN	Idler Spacing m	Skirt Length m	No. of Scrapers	Friction Factor Input
Station	Description											
35 Int. Pt		1206.07	13.30	3610.00	0.00	12.80	0		10			0.00000
36 Int. Pt		574.09	-10.10	2404.00	0.00	26.10	0		10			0.00000
37 Int. Pt		459.05	6.50	1830.00	0.00	16.00	0		10			0.00000
38 Int. Pt		1351.19	-22.50	1371.00	0.00	22.50	0		10			0.00000
Totals:		41590.48	0.28					0.00		6.00	12.00	

Helix DeltaT Conveyor Design program version: 1.0.7

www.helixconveyor.com



Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

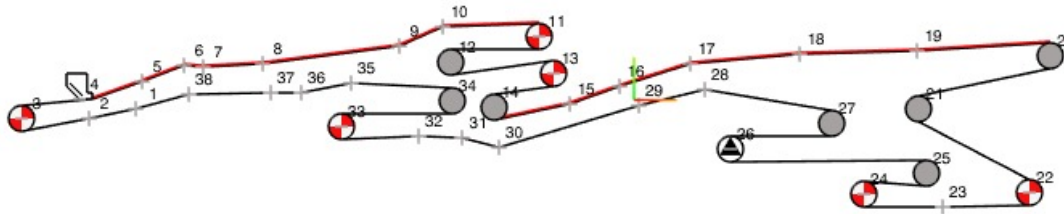
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland



Drive Torque Start-up Factor Loaded **110.00 %** Takeup Pulley Belt Tension **63.74 kN**
 Drive Torque Start-up Factor Empty **50.00 %** Takeup Mass **13000 kg**

			Running		Starting		Braking	
Drive / Brake Number			Fully Loaded	Empty Belt	Fully Loaded	Empty Belt	Fully Loaded	Empty Belt
Drive No.	1	Type: Drive	Tripper drv 1					
Pulley No.	11	Lagging Type:	Rubber		Rubber		Rubber	
Wrap Angle		°	188	188	188	188	188	188
Co-efficient of Friction			0.35	0.35	0.45	0.45	0.45	0.45
Drive Factor Cw			0.464	0.464	0.296	0.296	0.296	0.296
Calculated Belt Tension T1		kN	331.91	178.99	367.90	210.67	73.31	89.51
Calculated Belt Tension T2		kN	213.94	136.45	231.89	150.06	67.89	83.94
Minimum Required T2		kN	54.74	19.74	40.26	17.94	1.60	1.65
Surplus T2 Tension (T1-T2)		kN	159.20	116.71	191.63	132.12	66.29	82.29
Drive No.	2	Type: Drive	Tripper Drv 2					
Pulley No.	13	Lagging Type:	Rubber		Rubber		Rubber	
Wrap Angle		°	188	188	188	188	188	188
Co-efficient of Friction			0.35	0.35	0.45	0.45	0.45	0.45
Drive Factor Cw			0.464	0.464	0.296	0.296	0.296	0.296
Calculated Belt Tension T1		kN	215.94	138.16	233.93	151.84	69.53	85.30
Calculated Belt Tension T2		kN	97.52	95.46	97.28	90.71	65.36	81.21
Minimum Required T2		kN	54.95	19.81	40.45	18.09	1.23	1.21
Surplus T2 Tension (T1-T2)		kN	42.57	75.65	56.83	72.62	64.13	80.00
Drive No.	3	Type: Drive						
Pulley No.	22	Lagging Type:	Rubber		Rubber		Rubber	
Wrap Angle		°	180	180	180	180	180	180
Co-efficient of Friction			0.35	0.35	0.45	0.45	0.45	0.45
Drive Factor Cw			0.499	0.499	0.321	0.321	0.321	0.321
Calculated Belt Tension T1		kN	300.51	149.32	320.23	155.74	88.91	82.32
Calculated Belt Tension T2		kN	182.42	106.67	192.25	109.83	75.82	72.14
Minimum Required T2		kN	58.93	21.28	41.08	14.74	4.20	3.27
Surplus T2 Tension (T1-T2)		kN	123.49	85.39	151.17	95.09	71.62	68.87

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

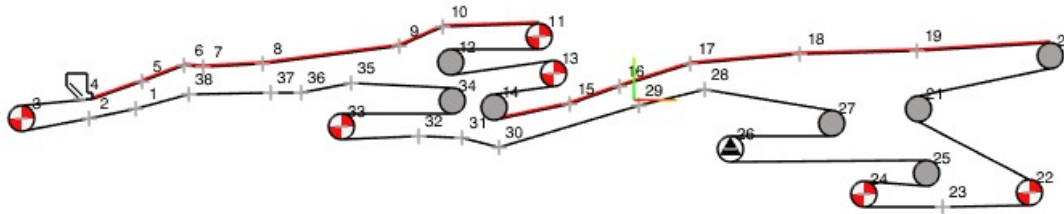
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland

Drive Torque Start-up Factor Loaded **110 %**

Takeup Pulley Belt Tension

63.74 kNDrive Torque Start-up Factor Empty **50 %**

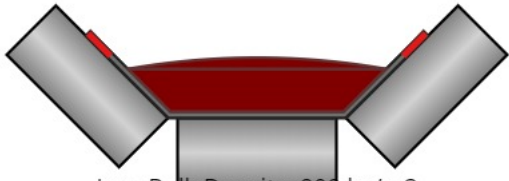


Takeup Mass

13000 kg

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
1 Int. Pt	96.24	115.61	97.54	113.57	103.70	131.93	23.10	27.68	53.03	79.98
2 Int. Pt	96.28	115.65	97.58	113.61	103.74	131.98	23.09	27.67	53.04	80.00
3 Drive	97.10	116.47	98.40	114.43	104.57	132.81	23.86	28.44	53.82	80.79
4 Hopper	97.93	117.38	99.24	115.33	105.43	133.77	95.48	100.15	54.47	81.59
5 Int. Pt	153.22	129.82	154.48	133.58	163.83	147.88	122.74	104.68	89.84	90.30
6 Int. Pt	152.91	129.91	154.57	133.27	164.57	148.54	113.03	102.12	82.84	89.14
7 Int. Pt	174.25	135.38	175.90	138.74	187.22	154.71	122.61	104.27	95.82	93.04
8 Int. Pt	177.45	136.71	177.20	142.27	193.16	157.51	101.12	98.64	81.47	91.09
9 Int. Pt	296.97	169.21	296.65	174.74	328.22	198.35	80.98	91.75	101.70	105.02
10 Int. Pt	296.44	169.41	296.82	174.51	329.03	199.27	68.40	88.55	92.61	103.61
11 Drive	331.91	178.99	332.28	184.08	367.90	210.67	73.31	89.51	106.35	109.13
12 Bend	215.27	137.78	220.75	134.89	233.23	151.41	69.11	85.17	104.06	108.13
13 Drive	215.94	138.16	221.44	135.26	233.93	151.84	69.53	85.30	104.55	108.40
14 Bend	98.55	96.49	109.19	85.59	98.32	91.76	66.28	82.13	102.73	107.71
15 Int. Pt	129.39	103.75	139.85	98.03	131.55	100.37	75.65	82.99	118.31	111.95
16 Int. Pt	186.25	118.47	196.30	112.78	193.85	118.01	83.65	83.93	140.43	120.17
17 Int. Pt	211.77	125.53	203.28	139.49	223.39	127.22	73.06	80.81	140.28	122.43
18 Int. Pt	269.96	141.16	261.44	155.11	287.60	146.09	77.10	81.16	159.98	130.86
19 Int. Pt	272.36	142.01	262.26	157.80	291.03	147.49	70.28	79.41	155.82	130.48
20 Head	298.72	148.66	288.63	164.45	318.16	154.55	89.69	84.10	177.24	136.21
21 Bend	298.91	148.29	288.78	164.14	318.60	154.65	87.60	81.56	175.81	134.81
22 Drive	300.51	149.32	290.34	165.23	320.23	155.74	88.91	82.32	177.20	135.72
23 Int. Pt	182.62	106.87	177.52	114.84	192.46	110.04	75.98	72.30	124.76	102.48

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
24 Drive	182.46	106.71	177.36	114.68	192.30	109.89	75.80	72.11	124.58	102.31
25 Bend	63.62	63.61	63.62	63.61	63.58	63.54	61.92	61.44	71.20	68.41
26 Takeup	63.74	63.74	63.74	63.74	63.74	63.74	63.74	63.74	63.74	63.74
27 Bend	63.78	63.78	63.78	63.78	63.81	63.84	63.44	63.45	63.54	63.62
28 Int. Pt	63.70	63.70	63.70	63.70	63.78	63.85	62.93	62.96	63.15	63.35
29 Int. Pt	65.72	65.72	65.72	65.72	66.10	66.42	62.27	62.42	63.27	64.16
30 Int. Pt	69.19	69.19	69.19	69.19	70.52	71.62	57.17	57.70	60.64	63.77
31 Int. Pt	76.66	76.66	76.66	76.66	79.00	80.92	55.60	56.53	61.69	67.17
32 Int. Pt	87.29	87.29	87.29	87.29	92.42	96.61	41.19	43.23	54.52	66.51
33 Drive	92.70	92.70	92.70	92.70	98.16	102.63	43.58	45.76	57.78	70.56
34 Bend	62.70	82.11	64.01	80.07	64.20	87.59	43.14	45.39	57.58	70.62
35 Int. Pt	86.16	105.55	87.46	103.51	91.57	118.15	31.43	35.21	56.04	78.22
36 Int. Pt	94.73	114.11	96.03	112.07	100.83	127.96	33.81	37.86	60.21	83.99
37 Int. Pt	93.97	113.35	95.27	111.31	100.39	127.80	30.11	34.29	57.36	81.90
38 Int. Pt	97.65	117.03	98.95	114.99	104.34	131.95	31.44	35.72	59.37	84.52
Minimum Tension	62.70	63.61	63.62	63.61	63.58	63.54	23.09	27.67	53.03	63.35
Maximum Tension	331.91	178.99	332.28	184.08	367.90	210.67	122.74	104.68	177.24	136.21
Effective Tension	506.64	183.81	484.93	217.78						
Ave.Belt Tension	149.81	114.89	150.27	116.76	160.31	126.21	65.96	68.83	85.77	90.24
Belt Elong. m	30.391	19.123	30.540	19.726	33.779	22.776	3.333	4.260	9.726	11.168
T/up Travel m	15.196	9.561	15.270	9.863	16.890	11.388	1.667	2.130	4.863	5.584

26 Jun 2020		Belt Details Report		Page: 8/66	
Helix Technologies Pty Ltd					
Project		Demo 12 Curragh North Overland		Client	
Project No.				Prepared By P Burrow	
Conveyor No.		C3 Overland		Design Date 01 Oct 2019	
<div><div><p>Low Bulk Density: 800 kg/m3</p></div><div><p>High Bulk Density: 900 kg/m3</p></div></div>					
Conveyed Material			Belt Speed & Capacity		
Material Description COAL BITUMINOUS SIZED			Belt Speed 7.5 m/s		
Low Bulk Density 800 kg/m3			Belt Design Capacity Input 2500 tonnes/hr		
High Bulk Density 900 kg/m3			Section Loading Max Capacity 2500 tonnes/hr		
Surcharge Angle 10 °			Carry Idler Trough Angle 45 °		
Angle of Repose 35 °			Belt Dimensions		
Material Lump Size 250 mm			Top Cover Thickness 7 mm		
Belt Make & Class			Bottom Cover Thickness 5 mm		
Belt Category Goodyear Steel			Belt Carcass Thickness 5.9 mm		
Belt Description GOODYEAR FLEXSTEEL STACKER			Belt Total Thickness 17.9 mm		
Belt Class / Plies ST 1500			Total Belt (Tape) Length 41612.9 m		
Belt Reinforcement Fibre STEEL			Time for 1 Revolution 5548.4 sec		
Belt Width 1200 mm			Belt Load Area & Capacity at 800kg/m3		
Belt Modulus 107463 kN/m			Minimum Rec. Edge Distance 89 mm		
Cord Diameter			Actual Edge Distance 149 mm		
Cord Pitch			Load Burden Depth 196 mm		
Number of Cords			Load Burden Width 768 mm		
Belt Tensions			Belt Load Area at Minimum Recommended Edge Distance 0.1532 m2		
Belt Rated Tension / m width 224 kN/m			Belt Load Area utilised at Low Bulk Density 0.1157 m2		
Calculated Tension / m width 276.9 kN/m			Belt Actual % Full at Low BD 75.5 %		
Belt Rated Tension for width 268.8 kN			Belt Load Area & Capacity at 900 kg/m3		
Calculated Max Run Tension 332.3 kN			Minimum Recommended Edge Distance 89 mm		
Minimum Tension Tmin 62.6 kN			Actual Edge Distance High BD 170 mm		
Allowable Tension Rise, Starting 150 %			Belt Load Area Utilised at High Bulk Density 0.1029 m2		
Allowable Belt Tension, Starting 403.2 kN			Belt Actual % Full at High BD 67.2 %		
Actual Belt Tension, Starting 367.9 kN			Flooded Belt Capacity at 900 kg/m3		
Belt and Material Mass			Flooded Belt Load Area at Zero Edge Distance 0.2181 m2		
Belt Top Cover Mass 9.6 kg/m			Flooded Belt Capacity 5300 tonnes/hr		
Belt Bottom Cover Mass 6.8 kg/m			Flooded Belt Material Mass 196.3 kg/m		
Belt Carcass Mass 15.8 kg/m					
Belt Mass Wb (per linear m) 30.0 kg/m					
Material Mass Wm (per linear m) 92.6 kg/m					
Total Mass (Wb + Wm) 122.6 kg/m					
Total Belt Mass (Wb x L) 1,248,387 kg					
Helix DeltaT Conveyor Design program version: 1.0.7 www.helixconveyor.com					
					

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

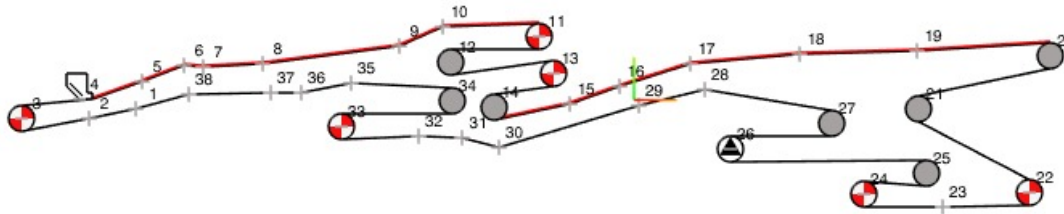
Conveyor No. C3 Overland

Design Date

01 Oct 2019




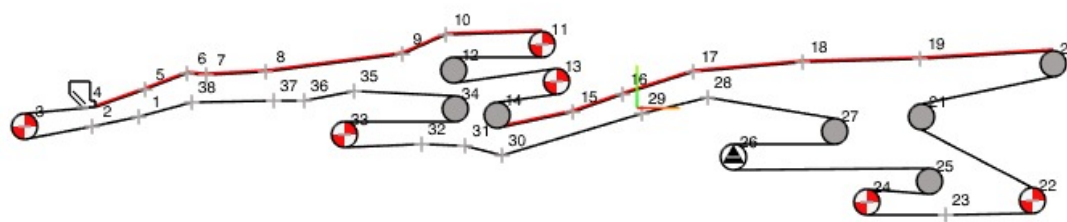

C3 Overland



Allowable Belt Sag % Running	2 %	Takeup Pulley Belt Tension	63.74 kN
Allowable Belt Sag % Start / Stop	5 %	Takeup Mass	13000 kg

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
1 Int. Pt	96.24	115.61	97.54	113.57	103.70	131.93	23.10	27.68	53.03	79.98
Idler Spacing m	10.00									
Belt Sag %	0.38	0.32	0.38	0.32	0.35	0.28	1.59	1.33	0.69	0.46
2 Int. Pt	96.28	115.65	97.58	113.61	103.74	131.98	23.09	27.67	53.04	80.00
Idler Spacing m	10.00									
Belt Sag %	0.38	0.32	0.38	0.32	0.35	0.28	1.59	1.33	0.69	0.46
3 Drive	97.10	116.47	98.40	114.43	104.57	132.81	23.86	28.44	53.82	80.79
Idler Spacing m	0.30									
Belt Sag %	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.04	0.02	0.01
4 Hopper	97.93	117.38	99.24	115.33	105.43	133.77	95.48	100.15	54.47	81.59
Idler Spacing m	5.00									
Belt Sag %	0.77	0.16	0.76	0.16	0.71	0.14	0.79	0.18	1.38	0.23
5 Int. Pt	153.22	129.82	154.48	133.58	163.83	147.88	122.74	104.68	89.84	90.30
Idler Spacing m	5.00									
Belt Sag %	0.49	0.14	0.12	0.56	0.46	0.12	0.61	0.18	0.84	0.20
6 Int. Pt	152.91	129.91	154.57	133.27	164.57	148.54	113.03	102.12	82.84	89.14
Idler Spacing m	5.00									
Belt Sag %	0.49	0.14	0.49	0.14	0.46	0.12	0.66	0.18	0.91	0.21
7 Int. Pt	174.25	135.38	175.90	138.74	187.22	154.71	122.61	104.27	95.82	93.04
Idler Spacing m	5.00									
Belt Sag %	0.43	0.14	0.10	0.54	0.40	0.12	0.61	0.18	0.78	0.20
8 Int. Pt	177.45	136.71	177.20	142.27	193.16	157.51	101.12	98.64	81.47	91.09
Idler Spacing m	5.00									
Belt Sag %	0.42	0.13	0.42	0.13	0.39	0.12	0.74	0.19	0.92	0.20

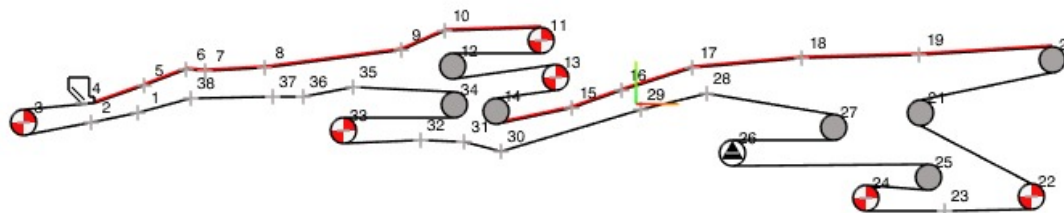
26 Jun 2020		Tension Calculations - Summary Belt Sag							Page: 12/66	
Helix Technologies Pty Ltd										
Project		Demo 12 Curragh North Overland				Client				
Project No.						Prepared By		P Burrow		
Conveyor No.		C3 Overland				Design Date		01 Oct 2019		
Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
31 Int. Pt	76.66	76.66	76.66	76.66	79.00	80.92	55.60	56.53	61.69	67.17
Idler Spacing m	10.00									
Belt Sag %	0.48	0.48	0.48	0.48	0.47	0.45	0.66	0.65	0.60	0.55
32 Int. Pt	87.29	87.29	87.29	87.29	92.42	96.61	41.19	43.23	54.52	66.51
Idler Spacing m	10.00									
Belt Sag %	0.42	0.42	0.42	0.42	0.40	0.38	0.89	0.85	0.67	0.55
33 Drive	92.70	92.70	92.70	92.70	98.16	102.63	43.58	45.76	57.78	70.56
Idler Spacing m	10.00									
Belt Sag %	0.40	0.40	0.40	0.40	0.37	0.36	0.84	0.80	0.64	0.52
34 Bend	62.70	82.11	64.01	80.07	64.20	87.59	43.14	45.39	57.58	70.62
Idler Spacing m	10.00									
Belt Sag %	0.59	0.45	0.57	0.46	0.57	0.42	0.85	0.81	0.64	0.52
35 Int. Pt	86.16	105.55	87.46	103.51	91.57	118.15	31.43	35.21	56.04	78.22
Idler Spacing m	10.00									
Belt Sag %	0.43	0.35	0.42	0.36	0.40	0.31	1.17	1.04	0.66	0.47
36 Int. Pt	94.73	114.11	96.03	112.07	100.83	127.96	33.81	37.86	60.21	83.99
Idler Spacing m	10.00									
Belt Sag %	0.39	0.32	0.38	0.33	0.36	0.29	1.09	0.97	0.61	0.44
37 Int. Pt	93.97	113.35	95.27	111.31	100.39	127.80	30.11	34.29	57.36	81.90
Idler Spacing m	10.00									
Belt Sag %	0.39	0.32	0.39	0.33	0.37	0.29	1.22	1.07	0.64	0.45
38 Int. Pt	97.65	117.03	98.95	114.99	104.34	131.95	31.44	35.72	59.37	84.52
Idler Spacing m	10.00									
Belt Sag %	0.38	0.31	0.37	0.32	0.35	0.28	1.17	1.03	0.62	0.44
Minimum Tension	62.70	63.61	63.62	63.61	63.58	63.54	23.09	27.67	53.03	63.35
Maximum Sag %	0.77	0.58	0.76	0.67	0.71	0.58	1.59	1.33	1.38	0.58
</										

26 Jun 2020		Tension Calculations - Run Fully Loaded				Page: 13/66						
Helix Technologies Pty Ltd												
Project		Demo 12 Curragh North Overland		Client								
Project No.				Prepared By		P Burrow						
Conveyor No.		C3 Overland		Design Date		01 Oct 2019						
<div><div></div><div></div></div>												
Run Fully Loaded												
Takeup Mass		13000 kg		Takeup Pulley Belt Tension		63.74 kN						
Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor
1 Int. Pt	10.00	0.00	96.24	96.24							0.04	0.0120
2 Int. Pt	10.01	-0.53	96.28	96.28						0.94	-0.12	0.0120
3 Drive	3.48	0.47	97.10	97.52	0.42						0.41	0.0455
4 Hopper	1367.73	22.00	97.93	97.93				5.21	0.59		49.49	0.0131
5 Int. Pt	459.05	-6.50	153.22	153.22							-0.31	0.0127
6 Int. Pt	574.09	10.10	152.91	152.91							21.34	0.0124
7 Int. Pt	1205.07	-13.30	174.25	174.25							3.20	0.0124
8 Int. Pt	6818.01	9.70	177.45	177.45							119.52	0.0123
9 Int. Pt	588.05	-8.00	296.97	296.97							-0.53	0.0120
10 Int. Pt	1492.04	10.61	296.44	296.44							35.47	0.0118
11 Drive	17.03	1.06	331.91	213.94	1.09	117.97				0.94	0.39	0.0113
12 Bend	17.03	-0.94	215.27	216.14	0.87						-0.20	0.0113
13 Drive	17.00	0.06	215.94	97.52	0.65	118.42				0.94	0.09	0.0113
14 Bend	1024.02	6.95	98.55	98.97	0.42			5.21			25.21	0.0126
15 Int. Pt	2385.04	14.50	129.39	129.39							56.86	0.0128
16 Int. Pt	1763.00	-2.20	186.25	186.25							25.52	0.0124
17 Int. Pt	2643.14	13.98	211.77	211.77							58.19	0.0122
18 Int. Pt	450.12	-3.78	269.96	269.96							2.40	0.0120
19 Int. Pt	339.46	17.61	272.36	272.36							26.36	0.0119
20 Head	394.28	-14.94	298.72	299.91	1.19					1.89	-2.89	0.0119
21 Bend	25.02	1.06	298.91	300.10	1.19						0.41	0.0119
22 Drive	5.04	0.61	300.51	182.42	0.97	118.09					0.20	0.0119
23 Int. Pt	5.04	-0.61	182.62	182.62							-0.16	0.0119
24 Drive	7.08	-1.06	182.46	63.91	0.52	118.54					-0.29	0.0119
25 Bend	37.02	-1.06	63.62	63.91	0.29						-0.17	0.0120
Helix DeltaT Conveyor Design program version: 1.0.7 www.helixconveyor.com												
												

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019



G3 Overland



Run Empty

Takeup Mass	13000 kg	Takeup Pulley Belt Tension	63.74 kN
-------------	-----------------	----------------------------	-----------------

Station	Section Length m	Section Lift m	Tensions CEMA-5(1)									VISCO Friction Factor
			T1 Run kN	T2 Run kN	Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	
1 Int. Pt	10.00	0.00	115.61	115.61							0.04	0.0119
2 Int. Pt	10.01	-0.53	115.65	115.65						0.94	-0.12	0.0111
3 Drive	3.48	0.47	116.47	116.97	0.50						0.41	0.0454
4 Hopper	1367.73	22.00	117.38	117.38							12.44	0.0115
5 Int. Pt	459.05	-6.50	129.82	129.82							0.09	0.0115
6 Int. Pt	574.09	10.10	129.91	129.91							5.47	0.0115
7 Int. Pt	1205.07	-13.30	135.38	135.38							1.33	0.0114
8 Int. Pt	6818.01	9.70	136.71	136.71							32.50	0.0114
9 Int. Pt	588.05	-8.00	169.21	169.21							0.20	0.0114
10 Int. Pt	1492.04	10.61	169.41	169.41							9.58	0.0114
11 Drive	17.03	1.06	178.99	136.45	0.65	42.54				0.94	0.39	0.0114
12 Bend	17.03	-0.94	137.78	138.36	0.58						-0.20	0.0114
13 Drive	17.00	0.06	138.16	95.46	0.50	42.70				0.94	0.09	0.0114
14 Bend	1024.02	6.95	96.49	96.92	0.42						6.83	0.0116
15 Int. Pt	2385.04	14.50	103.75	103.75							14.72	0.0115
16 Int. Pt	1763.00	-2.20	118.47	118.47							7.06	0.0115
17 Int. Pt	2643.14	13.98	125.53	125.53							15.63	0.0115
18 Int. Pt	450.12	-3.78	141.16	141.16							0.85	0.0114
19 Int. Pt	339.46	17.61	142.01	142.01							6.65	0.0114
20 Head	394.28	-14.94	148.66	149.28	0.62					1.89	-2.88	0.0119
21 Bend	25.02	1.06	148.29	148.91	0.62						0.41	0.0119
22 Drive	5.04	0.61	149.32	106.67	0.54	42.65					0.20	0.0119
23 Int. Pt	5.04	-0.61	106.87	106.87							-0.16	0.0119
24 Drive	7.08	-1.06	106.71	63.90	0.38	42.81					-0.29	0.0119
25 Bend	37.02	-1.06	63.61	63.91	0.30						-0.17	0.0120

26 Jun 2020			Tension Calculations - Run Empty							Page: 16/66			
Helix Technologies Pty Ltd													
Project Demo 12 Curragh North Overland			Client										
Project No.			Prepared By					P Burrow					
Conveyor No. C3 Overland			Design Date					01 Oct 2019					
Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor	
			T1 Run kN	T2 Run kN									
26 Takeup	16.04	-1.09	63.74	64.04	0.29						-0.26	0.0120	
27 Bend	55.04	-1.98	63.78	64.07	0.29						-0.37	0.0120	
28 Int. Pt	523.00	0.00	63.70	63.70							2.02	0.0120	
29 Int. Pt	1671.03	-10.20	65.72	65.72							3.47	0.0120	
30 Int. Pt	1764.00	2.20	69.19	69.19							7.47	0.0120	
31 Int. Pt	4883.08	-28.00	76.66	76.66							10.63	0.0120	
32 Int. Pt	588.05	7.47	87.29	87.29						0.94	4.47	0.0120	
33 Drive	13.00	0.02	92.70	82.05	0.38	10.65					0.06	0.0120	
34 Bend	6830.01	-11.15	82.11	82.47	0.36						23.08	0.0120	
35 Int. Pt	1206.07	13.30	105.55	105.55							8.56	0.0120	
36 Int. Pt	574.09	-10.10	114.11	114.11							-0.76	0.0119	
37 Int. Pt	459.05	6.50	113.35	113.35							3.68	0.0119	
38 Int. Pt	1351.19	-22.50	117.03	117.03							-1.42	0.0119	
Totals					6.46	180.85	0.00			5.65	171.70		
Maximum Tension			178.99		kN	Total Effective Tension					183.81		kN
Minimum Tension			63.61		kN	Total Belt Power					1378.59		kW
Average Tension Empty			114.89		kN	Belt Modulus					107463		kN/m
Average Tension Belt Stationary			55.63		kN	Total Belt Length					41612.90		m
Average Tension Difference			59.26		kN	Belt Elastic Elongation					19.123		m
						Takeup Movement					9.562		m
</													

26 Jun 2020			Tension Calculations - Run Inclines Loaded							Page: 18/66		
Helix Technologies Pty Ltd												
Project Demo 12 Curragh North Overland			Client									
Project No.			Prepared By					P Burrow				
Conveyor No. C3 Overland			Design Date					01 Oct 2019				
Station	Section Length m	Section Lift m	Tensions		CEMA-5(1) Tp Pulley kN	Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN								
26 Takeup	16.04	-1.09	63.74	64.04	0.29						-0.26	0.0120
27 Bend	55.04	-1.98	63.78	64.07	0.29						-0.37	0.0120
28 Int. Pt	523.00	0.00	63.70	63.70							2.02	0.0120
29 Int. Pt	1671.03	-10.20	65.72	65.72							3.47	0.0120
30 Int. Pt	1764.00	2.20	69.19	69.19							7.47	0.0120
31 Int. Pt	4883.08	-28.00	76.66	76.66							10.63	0.0120
32 Int. Pt	588.05	7.47	87.29	87.29						0.94	4.47	0.0120
33 Drive	13.00	0.02	92.70	63.95	0.35	28.75					0.06	0.0120
34 Bend	6830.01	-11.15	64.01	64.30	0.29						23.16	0.0120
35 Int. Pt	1206.07	13.30	87.46	87.46							8.57	0.0120
36 Int. Pt	574.09	-10.10	96.03	96.03							-0.76	0.0120
37 Int. Pt	459.05	6.50	95.27	95.27							3.68	0.0120
38 Int. Pt	1351.19	-22.50	98.95	98.95							-1.41	0.0120
Totals					8.83	480.93	0.00	10.42	0.59	5.65	459.44	
Maximum Tension			332.28	kN	Total Effective Tension			484.93	kN			
Minimum Tension			63.62	kN	Total Belt Power			3636.97	kW			
Average Tension Incl. Loaded			150.27	kN	Belt Modulus			107463	kN/m			
Average Tension Belt Stationary			55.63	kN	Total Belt Length			41612.90	m			
Average Tension Difference			94.64	kN	Belt Elastic Elongation			30.540	m			
					Takeup Movement			15.270	m			

Helix Technologies Pty Ltd

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

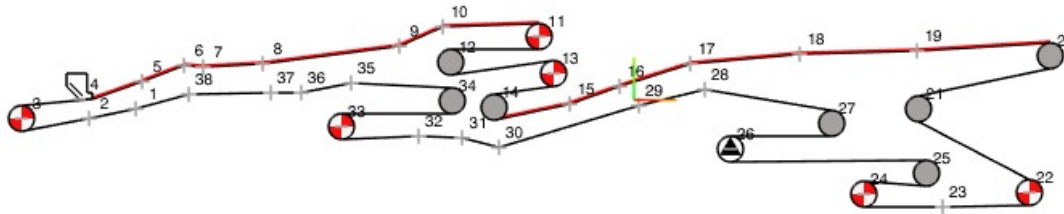
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland



Run Declines Loaded

Takeup Mass

13000 kg

Takeup Pulley Belt Tension

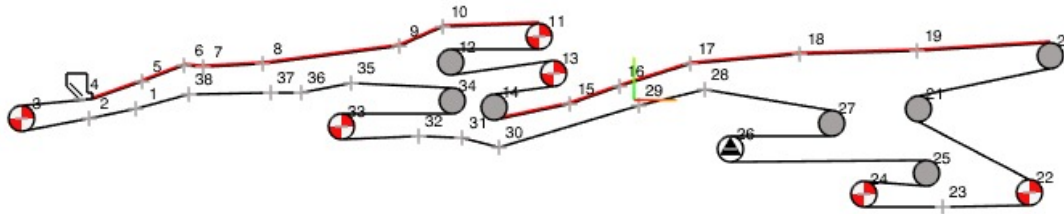
63.74 kN

Station	Section Length m	Section Lift m	Tensions			Drive Te kN	Tension Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension kN	VISCO Friction Factor
			T1 Run kN	T2 Run kN	CEMA-5(1) Tp Pulley kN							
1 Int. Pt	10.00	0.00	113.57	113.57							0.04	0.0119
2 Int. Pt	10.01	-0.53	113.61	113.61						0.94	-0.12	0.0119
3 Drive	3.48	0.47	114.43	114.92	0.49						0.41	0.0454
4 Hopper	1367.73	22.00	115.33	115.33				5.21	0.59		12.45	0.0115
5 Int. Pt	459.05	-6.50	133.58	133.58							-0.31	0.0127
6 Int. Pt	574.09	10.10	133.27	133.27							5.47	0.0114
7 Int. Pt	1205.07	-13.30	138.74	138.74							3.53	0.0126
8 Int. Pt	6818.01	9.70	142.27	142.27							32.47	0.0114
9 Int. Pt	588.05	-8.00	174.74	174.74							-0.23	0.0124
10 Int. Pt	1492.04	10.61	174.51	174.51							9.57	0.0114
11 Drive	17.03	1.06	184.08	133.56	0.66	50.52				0.94	0.39	0.0114
12 Bend	17.03	-0.94	134.89	135.46	0.57						-0.20	0.0114
13 Drive	17.00	0.06	135.26	84.56	0.47	50.70				0.94	0.09	0.0114
14 Bend	1024.02	6.95	85.59	85.97	0.38			5.21			6.85	0.0117
15 Int. Pt	2385.04	14.50	98.03	98.03							14.75	0.0116
16 Int. Pt	1763.00	-2.20	112.78	112.78							26.71	0.0129
17 Int. Pt	2643.14	13.98	139.49	139.49							15.62	0.0115
18 Int. Pt	450.12	-3.78	155.11	155.11							2.69	0.0125
19 Int. Pt	339.46	17.61	157.80	157.80							6.65	0.0114
20 Head	394.28	-14.94	164.45	165.13	0.68					1.89	-2.88	0.0119
21 Bend	25.02	1.06	164.14	164.82	0.68						0.41	0.0119
22 Drive	5.04	0.61	165.23	114.64	0.59	50.59					0.20	0.0119
23 Int. Pt	5.04	-0.61	114.84	114.84							-0.16	0.0119
24 Drive	7.08	-1.06	114.68	63.90	0.40	50.78					-0.29	0.0119
25 Bend	37.02	-1.06	63.61	63.91	0.30						-0.17	0.0120

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019



C3 Overland


System Masses

Mass of Belt	1,248,403 kg
Mass of Material	1,954,520 kg
Carry Idler Equivalent Mass	188,165 kg
Return Idler Equivalent Mass	58,867 kg
Pulley Equivalent Mass	17,013 kg
Drive Equivalent Mass	1,102,975 kg
Total System Equivalent Mass	4,569,943 kg
Conveyor load inertia at HSS	10,701.7 kgm ²

Input Data

Belt Speed	7.5 m/s
Belt Rated Tension	224 kN/m
Allowable Belt Start Tension Rise	150 %
Drive Inertia	2583.90 kg-m ²
Total Braking Torque	122.10 kNm
Start Up Factor - Full	110 %
Start Up Factor - Empty	50 %

Tensions and Accelerating Forces

Effective Tension Fully Loaded	506.64 kN
Effective Tension Empty	183.81 kN
Total Braking Force	206.03 kN
Tension Available to Accelerate conveyor	
Accelerating Tension - Loaded	79.29 kN
Accelerating Tension - Empty	82.52 kN

Installed Power	4250 kW
Drive Efficiency (Average)	94.00 %

Stopping Times & Deceleration Rates

Stopping Time Loaded Braking	48.09 s
Stopping Time Loaded Coasting	67.65 s
Stopping Time Empty Braking	50.32 s
Stopping Time Empty Coasting	106.72 s
Deceleration - Loaded Braking	-0.16 m/s ²
Deceleration - Loaded Coasting	-0.11 m/s ²
Deceleration - Empty Braking	-0.15 m/s ²
Deceleration - Empty Coasting	-0.07 m/s ²

Starting Times & Acceleration Rates

Starting Time - Fully Loaded	432.26 s
Starting Time - Empty	237.70 s
Acceleration Rate - Loaded	0.02 m/s ²
Acceleration Rate - Empty	0.03 m/s ²

Belt Tension Rise Starting / Braking

Max Belt Tension Start / Brake	367.90 kN
Belt Width	1200 mm
Max Belt Tension / Width	306.58 kN/m
Belt Rated Tension / Width	224 kN/m
Actual Max Tension Start/Brake	136.9 %
Allowable Tension Rise Start/Brake	150 %

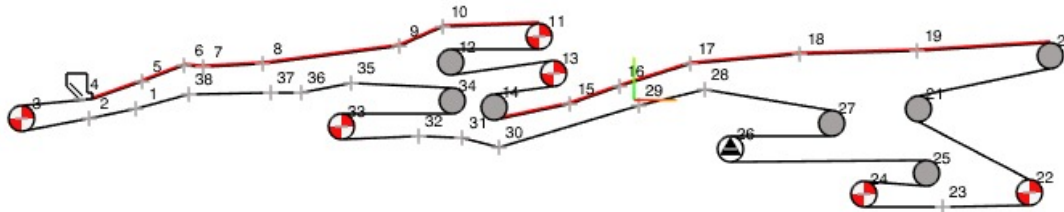
Stopping distances & Discharge Volumes

Stopping Distance Loaded Braking	180.35 m
Stopping Distance Loaded Coasting	253.69 m
Stopping Distance Empty Braking	188.69 m
Stopping Distance Empty Coasting	400.19 m
Discharge Mass Braking	16,699 kg
Discharge Mass Coasting	23,489 kg
Discharge Volume Braking	20.87 m ³
Discharge Volume Coasting	29.36 m ³

Project Demo 12 Curragh North Overland Client
 Project No. Prepared By P Burrow
 Conveyor No. C3 Overland Design Date 01 Oct 2019



C3 Overland



Carry Side Idlers		Return Side Idlers	
Idler Category	Sandvik Carry	Sandvik Carry	
Idler Description	Series 60 3 Roll Carry 178 Plain Inline	Series 40 3 Roll Carry 178 Plain Inline	
Idler Design Belt Width	1200 mm	1200 mm	
Idler Series	60	40	
Drawing Number			
Nominal Idler Spacing	5 m	10 m	
Total Number of Idlers	4296	2044	
Troughing Angle	45 deg	30 deg	
Idler Shaft Diameter	45 mm	30 mm	
Idler Bearing Diameter	45 mm	30 mm	
Number of Idler Rolls	3	3	
Idler Centre Roll Diameter	194 mm	178 mm	
Idler Wing Roll Diameter	194 mm	178 mm	
Idler Rotation Speed	738 rpm	805 rpm	
Centre Roll Face Width	444 mm	444 mm	
Wing Roll Face Width	444 mm	444 mm	
Roll Bearing Centres	346.9 mm	366.8 mm	
Shaft Support Centres	470.5 mm	467.4 mm	
Idler Support Fixing Width	1450 mm	1450 mm	
Idlerset Rotating Mass	43.8 kg	28.8 kg	
Idlerset Total Mass	90.1 kg	62.8 kg	
Idler Vertical Misalignment Allowance	6 mm	6 mm	
Dynamic Load Factor	1.79	1.40	
Belt Deviation Load	250 N	120 N	
Total Load on Centre Roll	6399 N	1807 N	
Type of Bearing	Ball	Ball	
Bearing Designation	6309	6306	
Bearing Dynamic Load Rating C	52,700 N	28,100 N	
Bearing L10h Life	100,865 hrs	623,340 hrs	
Allowable Shaft deflection At Bearing	8 min	8 min	
Actual Shaft deflection At Bearing	2.79 min	3.43 min	

Project Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

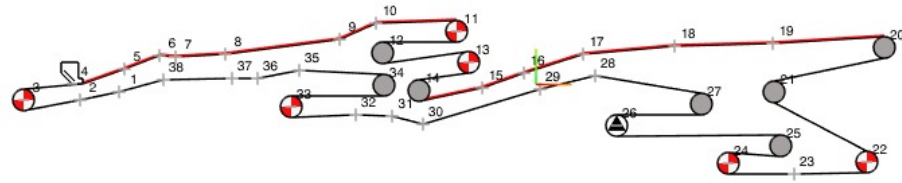
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland



Belt Width	1200	mm
Belt Mass - New Belt	30.00	kg/m
Top Cover Mass - New Belt	9.58	kg/m
Bottom Cover Mass	6.84	kg/m
Worn Belt Mass	22.5	kg/m
Reduction of Top Cover Mass	78.3	%
Conveyed Material Mass	92.59	kg/m

% Belt Mass for Lift off Calculation	75	%
Curve Tension Safety Factor	1	
Average Drive Torque safety Factor - Loaded	110	%
Average Drive Torque safety Factor - Empty	50	%
Belt Modulus	107,463	kN/m
Belt Rated Tension	Running: 224	kN/m Starting: 268.8 kN
Allowable Edge Tension	Running: 115	% Starting: 150 %

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
1	Int. Pt	Convex		96.24		115.61		103.70		131.93		23.10		27.68		

Project Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

Conveyor No. C3 Overland

Design Date

01 Oct 2019

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
Min Edge Tension Radius				81		89		84		97		60		61		154
Max Buckling Radius				154		114		136		94		-499		-679		
Belt Edge Tension Rise at Curve kN				Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
Total Edge Tension at Curve kN and %				Infinity		Infinity %		Infinity		Infinity %		Infinity		Infinity %		
Centre Tension at Curve kN				-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
2 Int. Pt	Convex			96.28		115.65		103.74		131.98		23.09		27.67		
Min Edge Tension Radius				81		89		84		97		60		61		153
Max Buckling Radius				153		114		135		94		-498		-679		
Belt Edge Tension Rise at Curve kN				Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
Total Edge Tension at Curve kN and %				Infinity		Infinity %		Infinity		Infinity %		Infinity		Infinity %		
Centre Tension at Curve kN				-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
3 Drive				97.10		116.47		104.57		132.81		23.86		28.44		
4 Hopper		2,500		97.93		117.38		105.43		133.77		95.48		100.15		
5 Int. Pt	Convex	2,500		153.22		129.82		163.83		147.88		122.74		104.68		
Min Edge Tension Radius				156		135		167		151		130		119		189
Max Buckling Radius				108		136		98		113		147		189		
Belt Edge Tension Rise at Curve kN				Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
Total Edge Tension at Curve kN and %				Infinity		Infinity %		Infinity		Infinity %		Infinity		Infinity %		
Centre Tension at Curve kN				-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
6 Int. Pt	Concave	2,500		152.91		129.91		164.57		148.54		113.03		102.12		
Min Concave Lift Off Radius				693		589		746		673		512		463		746
Min Edge Tension Radius				60		70		55		61		81		89		
Max Centre Tension Radius				78		68		84		76		62		59		

Project Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

Conveyor No. C3 Overland

Design Date

01 Oct 2019

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
7 Int. Pt	Convex	2,500		174.25		135.38		187.22		154.71		122.61		104.27		
	Min Edge Tension Radius				180		140		199		157		130		119	
	Max Buckling Radius				91		128		83		106		148		190	
	Belt Edge Tension Rise at Curve kN			Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
	Total Edge Tension at Curve kN and %			Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	
	Centre Tension at Curve kN			-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
8 Int. Pt	Concave	2,500		177.45		136.71		193.16		157.51		101.12		98.64		
	Min Concave Lift Off Radius				804		620		875		714		458		447	
	Min Edge Tension Radius				51		67		47		58		90		92	
	Max Centre Tension Radius				92		70		105		80		58		58	
9 Int. Pt	Convex	2,500		296.97		169.21		328.22		198.35		80.98		91.75		
	Min Edge Tension Radius				1999		174		-1272		219		106		112	
	Max Buckling Radius				47		94		42		77		299		236	
	Belt Edge Tension Rise at Curve kN			Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
	Total Edge Tension at Curve kN and %			Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	Infinity	Infinity %	
	Centre Tension at Curve kN			-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
10 Int. Pt	Concave	2,500		296.44		169.41		329.03		199.27		68.40		88.55		
	Min Concave Lift Off Radius				1343		768		1491		903		310		401	
	Min Edge Tension Radius				31		54		28		46		133		103	
	Max Centre Tension Radius				958		87		-610		111		50		55	
11 Drive				331.91		178.99		367.90		210.67		73.31		89.51		
12 Bend				215.27		137.78		233.23		151.41		69.11		85.17		
13 Drive				215.94		138.16		233.93		151.84		69.53		85.30		
14 Bend		2,500		98.55		96.49		98.32		91.76		66.28		82.13		

Project Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

Conveyor No. C3 Overland

Design Date

01 Oct 2019

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
15 Int. Pt		2,500		129.39		103.75		131.55		100.37		75.65		82.99		
16 Int. Pt		2,500		186.25		118.47		193.85		118.01		83.65		83.93		
17 Int. Pt		2,500		211.77		125.53		223.39		127.22		73.06		80.81		
18 Int. Pt	Convex	2,500		269.96		141.16		287.60		146.09		77.10		81.16	1129	
	Min Edge Tension Radius				620		145		1129		149		105			107
	Max Buckling Radius				53		120		49		115		330			297
	Belt Edge Tension Rise at Curve kN			Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
	Total Edge Tension at Curve kN and % Centre Tension at Curve kN			Infinity -Infinity	Infinity %	Infinity Infinity	Infinity %	Infinity -Infinity	Infinity %	Infinity -Infinity	Infinity %	Infinity -Infinity	Infinity %	Infinity -Infinity		Infinity %
19 Int. Pt	Concave	2,500		272.36		142.01		291.03		147.49		70.28		79.41	1319	
	Min Concave Lift Off Radius				1234		644		1319		668		319			360
	Min Edge Tension Radius				33		64		31		62		130			115
	Max Centre Tension Radius				330		73		671		75		51			53
20 Head				298.72		148.66		318.16		154.55		89.69		84.10		
21 Bend				298.91		148.29		318.60		154.65		87.60		81.56		
22 Drive				300.51		149.32		320.23		155.74		88.91		82.32		
23 Int. Pt	Convex			182.62		106.87		192.46		110.04		75.98		72.30	269	
	Min Edge Tension Radius				136		85		147		86		74			73
	Max Buckling Radius				60		129		56		123		241			269
	Belt Edge Tension Rise at Curve kN			Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
	Total Edge Tension at Curve kN and % Centre Tension at Curve kN			Infinity -Infinity	Infinity %	Infinity Infinity	Infinity %	Infinity -Infinity	Infinity %	Infinity -Infinity	Infinity %	Infinity -Infinity	Infinity %	Infinity -Infinity		Infinity %
24 Drive				182.46		106.71		192.30		109.89		75.80		72.11		
25 Bend				63.62		63.61		63.58		63.54		61.92		61.44		

Project Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

Conveyor No. C3 Overland

Design Date

01 Oct 2019

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
26 Takeup				63.74		63.74		63.74		63.74		63.74		63.74		
27 Bend				63.78		63.78		63.81		63.84		63.44		63.45		
28 Int. Pt Concave				63.70		63.70		63.78		63.85		62.93		62.96		289
Min Concave Lift Off Radius				289		289		289		289		285		285		
Min Edge Tension Radius				143		143		143		143		145		145		
Max Centre Tension Radius				35		35		35		35		35		35		
29 Int. Pt				65.72		65.72		66.10		66.42		62.27		62.42		
30 Int. Pt				69.19		69.19		70.52		71.62		57.17		57.70		
31 Int. Pt				76.66		76.66		79.00		80.92		55.60		56.53		
32 Int. Pt Concave				87.29		87.29		92.42		96.61		41.19		43.23		438
Min Concave Lift Off Radius				396		396		419		438		187		196		
Min Edge Tension Radius				104		104		99		94		221		211		
Max Centre Tension Radius				39		39		40		40		32		32		
33 Drive				92.70		92.70		98.16		102.63		43.58		45.76		
34 Bend				62.70		82.11		64.20		87.59		43.14		45.39		
35 Int. Pt Concave				86.16		105.55		91.57		118.15		31.43		35.21		535
Min Concave Lift Off Radius				390		478		415		535		142		160		
Min Edge Tension Radius				106		86		100		77		290		259		
Max Centre Tension Radius				39		42		39		45		31		31		
36 Int. Pt Convex				94.73		114.11		100.83		127.96		33.81		37.86		

Project Demo 12 Curragh North Overland

Client

Project No.

Prepared By

P Burrow

Conveyor No. C3 Overland

Design Date

01 Oct 2019

Station / Section Information				Running				Starting				Braking				Minimum Required Radius m
Station	Curve Type	Load Capacity tph	Design Curve Radius m	Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
				Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	
Min Edge Tension Radius Max Buckling Radius Belt Edge Tension Rise at Curve kN Total Edge Tension at Curve kN and % Centre Tension at Curve kN				80		88		82		95		62		63		158
				158		116		142		98		-1320		-3494		
				Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
				Infinity		Infinity %		Infinity		Infinity %		Infinity		Infinity %		
				-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		
37 Int. Pt	Concave			93.97		113.35		100.39		127.80		30.11		34.29		
Min Concave Lift Off Radius Min Edge Tension Radius Max Centre Tension Radius				426		514		455		579		136		155		579
				97		80		91		71		303		266		
				40		44		41		47		31		31		
38 Int. Pt	Convex			97.65		117.03		104.34		131.95		31.44		35.72		
Min Edge Tension Radius Max Buckling Radius Belt Edge Tension Rise at Curve kN Total Edge Tension at Curve kN and % Centre Tension at Curve kN				81		89		84		97		62		63		150
				150		112		134		94		-967		-1867		
				Infinity		Infinity		Infinity		Infinity		Infinity		Infinity		
				Infinity		Infinity %		Infinity		Infinity %		Infinity		Infinity %		
				-Infinity		Infinity		-Infinity		-Infinity		-Infinity		-Infinity		

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

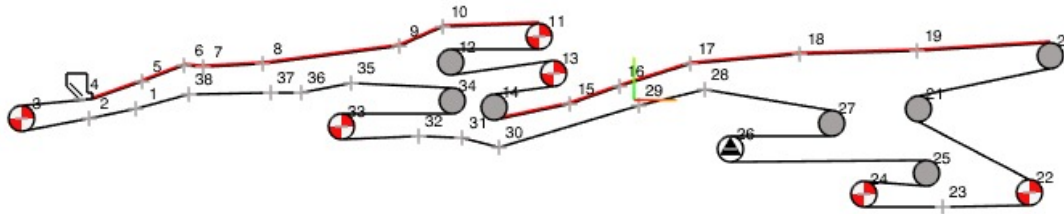
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland



Viscoelastic Calculations Input Data

Belt Rubber Description	Low Resistance Rubber Compound	Carry Idler Centre Roll Dia	194 mm
Top Cover Dynamic Modulus E'	6 N/mm2	Carry Idler Centre Roll Drag	1.2 N
Top Cover Dynamic Loss Factor Tan(delta)	0.1019	Carry Idler Wing Roller Dia	178 mm
Belt Top Cover Temperature	-2 deg C	Carry Idler Wing Roller Dia	1.2 N
Rolling Resistance Factor Top: 0.072 Bottom: 0.072		Return Idler Centre Roll Dia	178 mm
Bottom Cover Dynamic Modulus E	6 N/mm2	Return Idler Centre Roll Drag	1.2 N
Bottom Cover Dynamic Loss Factor Tan(delta)	0.1019	Return Idler Wing Roll Dia	178 mm
Belt Bottom Cover Temperature	-2 deg C	Return Idler Wing Roll Drag	1.2 N
Belt & Material Flexure Adjustment Factor	0.8	Idlerset Skew Angle	0.1 deg
Belt has Turnover on return run	Yes	Idlerset Forward Tilt Angle	0.1 deg

Station	Section Length m	Idler Spacing m	Loaded									Empty	
			Total Loaded friction factor f	Indent factor fi	Indent factor %	Freq- uency rad/s	Matl. & Belt Flexure friction fm	Flexure friction %	Idler Drag factor fr	Idler Drag factor %	Idler Skew & Tilt friction ft	Tilt friction %	Empty friction factor f
1 Int. Pt *	10.00	10.00	0.0120	0.00928	77.7	1808	0.00013	1.1	0.00122	10.2	0.00131	11.0	0.0119
2 Int. Pt *	10.01	10.00	0.0120	0.00928	77.7	1808	0.00013	1.1	0.00122	10.2	0.00131	11.0	0.0119
3 Drive	3.48	0.30	0.0455	0.00285	6.3	5653	0.00050	1.1	0.04079	89.7	0.00131	2.9	0.0454
4 Hopper	1367.73	5.00	0.0131	0.00920	70.4	1181	0.00222	17.0	0.00060	4.6	0.00106	8.1	0.0115
5 Int. Pt	459.05	5.00	0.0127	0.00920	72.5	1181	0.00183	14.4	0.00060	4.7	0.00106	8.4	0.0115
6 Int. Pt	574.09	5.00	0.0124	0.00920	74.0	1181	0.00157	12.7	0.00060	4.8	0.00106	8.5	0.0115
7 Int. Pt	1205.07	5.00	0.0124	0.00920	74.5	1181	0.00150	12.1	0.00060	4.8	0.00106	8.6	0.0114
8 Int. Pt	6818.01	5.00	0.0123	0.00920	74.9	1181	0.00142	11.5	0.00060	4.9	0.00106	8.6	0.0114
9 Int. Pt	588.05	5.00	0.0120	0.00920	76.7	1181	0.00113	9.4	0.00060	5.0	0.00106	8.8	0.0114
10 Int. Pt	1492.04	5.00	0.0118	0.00920	77.9	1181	0.00095	8.1	0.00060	5.1	0.00106	9.0	0.0114
11 Drive	17.03	5.00	0.0113	0.00729	64.8	2213	0.00021	1.8	0.00245	21.7	0.00131	11.7	0.0114
12 Bend	17.03	5.00	0.0113	0.00729	64.4	2213	0.00027	2.4	0.00245	21.6	0.00131	11.6	0.0114
13 Drive	17.00	5.00	0.0113	0.00729	64.4	2213	0.00027	2.4	0.00245	21.6	0.00131	11.6	0.0114
14 Bend	1024.02	4.00	0.0126	0.00854	68.0	1273	0.00221	17.6	0.00075	6.0	0.00106	8.4	0.0116
15 Int. Pt	2385.04	5.00	0.0128	0.00920	71.7	1181	0.00197	15.4	0.00060	4.7	0.00106	8.3	0.0115
16 Int. Pt	1763.00	5.00	0.0124	0.00920	74.2	1181	0.00154	12.4	0.00060	4.8	0.00106	8.6	0.0115
17 Int. Pt	2643.14	5.00	0.0122	0.00920	75.7	1181	0.00129	10.6	0.00060	4.9	0.00106	8.7	0.0115
18 Int. Pt	450.12	5.00	0.0120	0.00920	76.8	1181	0.00112	9.3	0.00060	5.0	0.00106	8.9	0.0114
19 Int. Pt	339.46	5.00	0.0119	0.00920	77.5	1181	0.00102	8.6	0.00060	5.0	0.00106	8.9	0.0114
20 Head *	394.28	10.00	0.0119	0.00928	78.2	1808	0.00005	0.5	0.00122	10.3	0.00131	11.1	0.0119
21 Bend *	25.02	10.00	0.0119	0.00928	78.2	1808	0.00005	0.4	0.00122	10.3	0.00131	11.1	0.0119
22 Drive *	5.04	10.00	0.0119	0.00928	78.2	1808	0.00005	0.4	0.00122	10.3	0.00131	11.1	0.0119

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

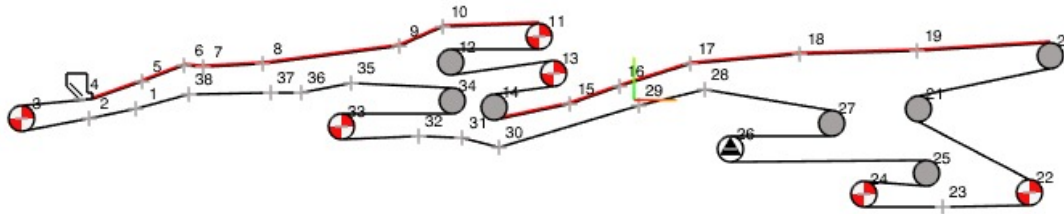
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland



Running Fully Loaded Belt Resonance

Carry Roll Diameter	194 mm	Belt Speed	7.5 m/s
Return Roll Diameter	178 mm	Takeup Mass	13000 kg
		Belt Resonance +/- Tolerance	2 %

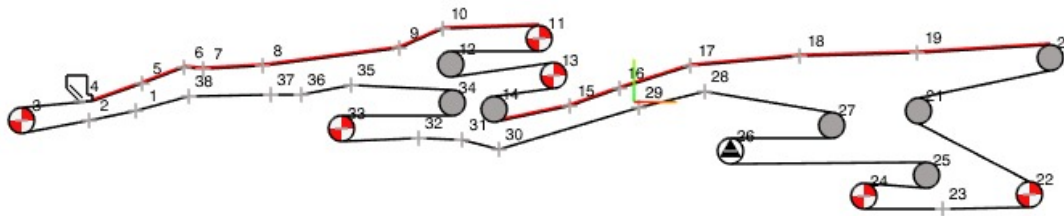
Station / Section		Start Belt Tension kN	End Belt Tension kN	Belt Transverse Wave Frequency Range Hz to Hz		Idler Roll Excitation Frequency Hz	Section Idler Spacing m	Critical Idler Spacing Start m	Critical Idler Spacing End m	Idler Spacing Within +/- 2% m	Mode
Station	Description										
1 Int. Pt		96.24	96.28	2.78	2.78	13.41	10	2.07	2.07	OK	
2 Int. Pt		96.28	97.1	2.78	2.8	13.41	10	2.07	2.08	OK	
3 Drive	Tail Brake	97.52	97.93	93.38	93.58	12.31	0.3	2.28	2.28	OK	
4 Hopper		97.93	153.22	2.63	3.38	12.31	5	1.07	1.37	OK	
5 Int. Pt		153.22	152.91	3.38	3.37	12.31	5	1.37	1.37	OK	
6 Int. Pt		152.91	174.25	3.37	3.62	12.31	5	1.37	1.47	OK	
7 Int. Pt		174.25	177.45	3.62	3.66	12.31	5	1.47	1.49	OK	
8 Int. Pt		177.45	296.97	3.66	4.81	12.31	5	1.49	1.95	Warning	3
9 Int. Pt		296.97	296.44	4.81	4.8	12.31	5	1.95	1.95	OK	
10 Int. Pt		296.44	331.91	4.8	5.1	12.31	5	1.95	2.07	OK	
11 Drive	Tripper drv 1	213.94	215.27	8.38	8.4	12.31	5	3.4	3.41	OK	
12 Bend		216.14	215.94	8.42	8.42	12.31	5	3.42	3.42	OK	
13 Drive	Tripper Drv 2	97.52	98.55	5.6	5.63	12.31	5	2.28	2.29	OK	
14 Bend		98.97	129.39	3.3	3.84	12.31	4	1.07	1.25	OK	
15 Int. Pt		129.39	186.25	3.08	3.75	12.31	5	1.25	1.53	OK	
16 Int. Pt		186.25	211.77	3.75	4.02	12.31	5	1.53	1.63	OK	
17 Int. Pt		211.77	269.96	4.02	4.57	12.31	5	1.63	1.86	Warning	3
18 Int. Pt		269.96	272.36	4.57	4.59	12.31	5	1.86	1.87	OK	
19 Int. Pt		272.36	298.72	4.59	4.82	12.31	5	1.87	1.96	OK	
20 Head		299.91	298.91	4.97	4.96	13.41	10	3.71	3.7	OK	
21 Bend		300.1	300.51	4.97	4.98	13.41	10	3.71	3.71	OK	
22 Drive		182.42	182.62	3.86	3.87	13.41	10	2.88	2.88	OK	
23 Int. Pt		182.62	182.46	3.86	3.86	13.41	10	2.88	2.88	OK	
24 Drive		63.91	63.62	2.25	2.24	13.41	10	1.68	1.67	OK	
25 Bend		63.91	63.74	2.25	2.24	13.41	10	1.68	1.67	OK	
26 Takeup		64.04	63.78	2.25	2.24	13.41	10	1.68	1.67	OK	
27 Bend		64.07	63.7	2.25	2.24	13.41	10	1.68	1.67	OK	
28 Int. Pt		63.7	65.72	2.24	2.28	13.41	10	1.67	1.7	OK	

26 Jun 2020		Conveyor Belt Resonance Report					Page: 32/66				
Helix Technologies Pty Ltd											
Project		Demo 12 Curragh North Overland				Client					
Project No.						Prepared By		P Burrow			
Conveyor No.		C3 Overland				Design Date		01 Oct 2019			
Station / Section		Start Belt Tension kN	End Belt Tension kN	Belt Transverse Wave Frequency Range		Idle Roll Excitation Frequency Hz	Section Idler Spacing m	Critical Idler Spacing Start m	Critical Idler Spacing End m	Idler Spacing Within +/- 2% m	Mode
Station	Description			Hz	to Hz						
29 Int. Pt	Return Drv	65.72	69.19	2.28	2.34	13.41	10	1.7	1.75	OK	
30 Int. Pt		69.19	76.66	2.34	2.47	13.41	10	1.75	1.84	OK	
31 Int. Pt		76.66	87.29	2.47	2.64	13.41	10	1.84	1.97	OK	
32 Int. Pt		87.29	92.7	2.64	2.73	13.41	10	1.97	2.03	OK	
33 Drive		62.64	62.7	2.22	2.22	13.41	10	1.66	1.66	OK	
34 Bend		62.99	86.16	2.23	2.63	13.41	10	1.66	1.96	OK	
35 Int. Pt		86.16	94.73	2.63	2.76	13.41	10	1.96	2.06	OK	
36 Int. Pt		94.73	93.97	2.76	2.75	13.41	10	2.06	2.05	OK	
37 Int. Pt		93.97	97.65	2.75	2.8	13.41	10	2.05	2.09	OK	
38 Int. Pt		97.65	96.24	2.8	2.78	13.41	10	2.09	2.07	OK	
All Figures are Running Fully Loaded Scenario											

Project Demo 12 Curragh North Overland Client
 Project No. Prepared By P Burrow
 Conveyor No. C3 Overland Design Date 01 Oct 2019



C3 Overland



Takeup Travel

Takeup Type	Vertical Gravity
Takeup Mass Calculation Method	Auto
Takeup Mass Step Increment	1000 kg
Max number of calc Increments	100
Takeup Mass kg (manual input)	13,000 kg
Takeup Tension (manual input)	63.74 kN
Takeup Mass calculated	13,000 kg

Takeup Travel Estimate

Safety Margin Top	+	0.50 m
Belt Splice Allowance	+	2.00 m
Dynamic Travel Up	+	1.00 m
Dynamic Travel Down	+	2.00 m
Safety Margin Bottom	+	0.50 m

Thermal Expansion Distance

Minimum Site Temperature	10 °C
Maximum Site Temperature	45 °C
Belt Expansion Coefficient mm per °C	0.0000117 mm/°C
Total Belt Length	41612.90 m
Thermal Expansion Distance	+ 8.520 m

Permanent Belt Stretch

Permanent Stretch Co-efficient % of belt Length		0.15 %
Permanent Belt Stretch Distance	+	31.210 m
Total Takeup Travel Distance	=	45.73 m



8.52m, Thermal Exp.

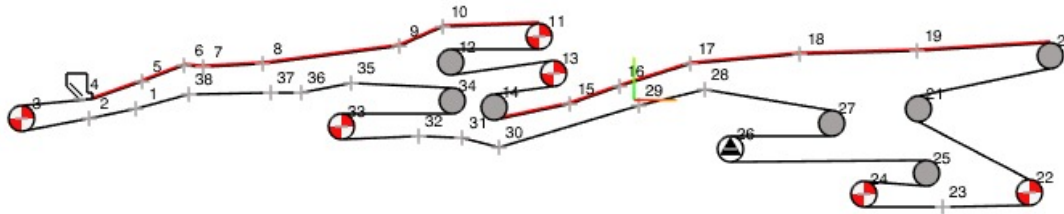
31.21m, Belt Stretch

45.73m, Total Travel

Project Demo 12 Curragh North Overland Client
 Project No. Prepared By P Burrow
 Conveyor No. C3 Overland Design Date 01 Oct 2019



C3 Overland



Drive Number	6	Drive	Pulley Number	3
Drive Description		Brake	Pulley Condition	Moist
Load Share on Drive Pulley		0 %	Pulley Lagging Type	Rubber
Starting Torque Factor Fully Loaded		100 %	Belt Wrap Angle	180 °
Starting Torque Factor Empty		100 %	Coefficient of Friction Running	0.25
Number of Motors on Drive Pulley		1	Drive Factor Cw Running	0.84
Motor Description		Brake only	Coefficient of friction Starting	0.35
Motor Power Rating		0 kW	Drive Factor Cw Starting	0.50
Motor Voltage		415 V	Pulley and Shaft Dimensions	
Gearbox Description		Brake only	Pulley Shell Diameter	1053 mm
Drive Efficiency		94 %	Pulley Lagging Thickness	12 mm
Fluid Coupling			Pulley Outside Diameter	1077 mm
Fluid Coupling		No Selection - Direct Drive	Pulley Shaft Diameter at Hub	200 mm
Fluid Coupling Size			Pulley Shaft Diameter at Bearing	200 mm
High Speed Coupling			Pulley and Belt Speed	
HS Coupling Make		Falk	Motor Full Load Speed	0 rpm
HS Coupling Model		1020T	Required Gearbox Ratio	0 : 1
Low Speed Coupling			Selected Gearbox Ratio	0 : 1
LS Coupling Make		Falk	Required Pulley Speed	NaN rpm
LS Coupling Model		1140T	Calculated Pulley Speed for Reducer	0 rpm
Brake			Required Belt Speed	7.5 m/s
Brake Location		High Speed	Calculated Belt Speed	0 m/s
Low Speed Brake Torque Input		40.7 kNm	Drive Inertia	
Equivalent HS Brake Torque		0 kN	Motor Inertia	0 kg-m2
HoldBack			High Speed Coupling Inertia	0 kg-m2
Static Analysis RunBack Force Fv		65,080 N	High Speed Brake Disc Inertia	0 kg-m2
Static Analysis Horizontal Force Fh		441,560 N	FlyWheel Inertia	0 kg-m2
Calculated HoldBack Torque		N/A Nm	Gearbox Inertia HSS	0 kg-m2
HoldBack Required (Yes/No) Fv>Fh/2		No	Total Drive Inertia	1 kg-m2
HoldBack Req Torque 3x Motor FLT		0 Nm	Total Drive Equivalent Mass	0 kg
HoldBack Make		Not Installed		
HoldBack Model				
HoldBack Rated Torque		0 Nm		

[illegible]

Helix Technologies Pty Ltd

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019

Drive Number	2	Drive	Pulley Number	13
--------------	---	-------	---------------	----

Drive Description	Tripper	Pulley Condition	Dry
Load Share on Drive Pulley	23.5 %	Pulley Lagging Type	Rubber
Starting Torque Factor Fully Loaded	110 %	Belt Wrap Angle	188 °
Starting Torque Factor Empty	50 %	Coefficient of Friction Running	0.35
Number of Motors on Drive Pulley	1	Drive Factor Cw Running	0.46
Motor Description	ASEA MBR 3300V Motor	Coefficient of friction Starting	0.45
Motor Power Rating	1000 kW	Drive Factor Cw Starting	0.30

Motor Voltage	3300 V	Pulley and Shaft Dimensions	
Gearbox Description	Flender Helical Bevel Gear	Pulley Shell Diameter	1224 mm
Drive Efficiency	94 %	Pulley Lagging Thickness	12 mm

Fluid Coupling

Fluid Coupling	No Selection - Direct Drive	Pulley Shaft Diameter at Hub	240 mm
Fluid Coupling Size		Pulley Shaft Diameter at Bearing	240 mm

High Speed Coupling

HS Coupling Make	Falk	Motor Full Load Speed	1480 rpm
HS Coupling Model	1140T	Required Gearbox Ratio	12.895 :1

Low Speed Coupling

LS Coupling Make	Falk	Required Pulley Speed	114.77 rpm
LS Coupling Model	1220T	Calculated Pulley Speed for Reducer	118.4 rpm

Brake

Brake Location	High Speed	Required Belt Speed	11.5 m/s
		Calculated Belt Speed	7.74 m/s

Low Speed Brake Torque Input	0 kNm	Drive Inertia	
Equivalent HS Brake Torque	0 kN	Motor Inertia	0 kg-m2

HoldBack

Static Analysis RunBack Force Fv	65,080 N	High Speed Brake Disc Inertia	0 kg-m2
Static Analysis Horizontal Force Fh	441,560 N	FlyWheel Inertia	0 kg-m2
Calculated HoldBack Torque	N/A Nm	Gearbox Inertia HSS	1.88433 kg-m2
HoldBack Required (Yes/No) Fv>Fh/2	No	Total Drive Inertia	72.9 kg-m2
HoldBack Req Torque 3x Motor FLT	249,618 Nm	Total Drive Equivalent Mass	31,130 kg
HoldBack Make	Not Installed		
HoldBack Model			
HoldBack Rated Torque	0 Nm		

Helix Technologies Pty Ltd

Project	Demo 12 Curragh North Overland	Client
Project No.		Prepared By P Burrow
Conveyor No.	C3 Overland	Design Date 01 Oct 2019
Drive Number	3 Drive	Pulley Number 22
Drive Description	Return	Pulley Condition Dry
Load Share on Drive Pulley	23.5 %	Pulley Lagging Type Rubber
Starting Torque Factor Fully Loaded	110 %	Belt Wrap Angle 180 °
Starting Torque Factor Empty	50 %	Coefficient of Friction Running 0.35
Number of Motors on Drive Pulley	1	Drive Factor Cw Running 0.50
Motor Description	ASEA MBR 3300V Motor	Coefficient of friction Starting 0.45
Motor Power Rating	1000 kW	Drive Factor Cw Starting 0.32
Motor Voltage	3300 V	
Gearbox Description	Flender Helical Bevel Gear	Pulley and Shaft Dimensions
Drive Efficiency	94 %	Pulley Shell Diameter 1224 mm
Fluid Coupling		Pulley Lagging Thickness 12 mm
Fluid Coupling	No Selection - Direct Drive	Pulley Outside Diameter 1248 mm
Fluid Coupling Size		Pulley Shaft Diameter at Hub 260 mm
High Speed Coupling		Pulley Shaft Diameter at Bearing 260 mm
HS Coupling Make	Falk	Pulley and Belt Speed
HS Coupling Model	1140T	Motor Full Load Speed 1480 rpm
Low Speed Coupling		Required Gearbox Ratio 12.895 :1
LS Coupling Make	Falk	Selected Gearbox Ratio 12.5 :1
LS Coupling Model	1220T	Required Pulley Speed 114.77 rpm
Brake		Calculated Pulley Speed for Reducer 118.4 rpm
Brake Location	High Speed	Required Belt Speed 7.5 m/s
Low Speed Brake Torque Input	40.7 kNm	Calculated Belt Speed 7.74 m/s
Equivalent HS Brake Torque	0 kN	Drive Inertia
HoldBack		Motor Inertia 0 kg-m2
Static Analysis RunBack Force Fv	65,080 N	High Speed Coupling Inertia 0 kg-m2
Static Analysis Horizontal Force Fh	441,560 N	High Speed Brake Disc Inertia 0 kg-m2
Calculated HoldBack Torque	N/A Nm	FlyWheel Inertia 0 kg-m2
HoldBack Required (Yes/No) Fv>Fh/2	No	Gearbox Inertia HSS 1.88433 kg-m2
HoldBack Req Torque 3x Motor FLT	249,618 Nm	Total Drive Inertia 1200 kg-m2
HoldBack Make	Not Installed	Total Drive Equivalent Mass 512,436 kg
HoldBack Model		
HoldBack Rated Torque	0 Nm	

Helix DeltaT Conveyor Design program version: 1.0.7
www.helixconveyor.com

Helix Technologies Pty Ltd

Project	Demo 12 Curragh North Overland Client		
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019

Drive Number	4	Drive	Pulley Number	24
--------------	---	-------	---------------	----

Drive Description	Return	Pulley Condition	Dry
Load Share on Drive Pulley	23.5 %	Pulley Lagging Type	Rubber
Starting Torque Factor Fully Loaded	110 %	Belt Wrap Angle	180 °
Starting Torque Factor Empty	50 %	Coefficient of Friction Running	0.35
Number of Motors on Drive Pulley	1	Drive Factor Cw Running	0.50
Motor Description	ASEA MBR 3300V Motor	Coefficient of friction Starting	0.45
Motor Power Rating	1000 kW	Drive Factor Cw Starting	0.32
Motor Voltage	3300 V	Pulley and Shaft Dimensions	
Gearbox Description	Flender Helical Bevel Gear	Pulley Shell Diameter	1224 mm
Drive Efficiency	94 %	Pulley Lagging Thickness	12 mm

Fluid Coupling

Fluid Coupling	No Selection - Direct Drive	Pulley Shaft Diameter at Hub	240 mm
Fluid Coupling Size		Pulley Shaft Diameter at Bearing	240 mm

High Speed Coupling

HS Coupling Make	Falk	Motor Full Load Speed	1480 rpm
HS Coupling Model	1140T	Required Gearbox Ratio	12.895 :1

Low Speed Coupling

LS Coupling Make	Falk	Required Pulley Speed	114.77 rpm
LS Coupling Model	1220T	Calculated Pulley Speed for Reducer	118.4 rpm

Brake

Brake Location	High Speed	Required Belt Speed	11.5 m/s
		Calculated Belt Speed	7.74 m/s

Low Speed Brake Torque Input	40.7 kNm	Drive Inertia	
Equivalent HS Brake Torque	0 kN	Motor Inertia	0 kg-m2

HoldBack

Static Analysis RunBack Force Fv	65,080 N	High Speed Brake Disc Inertia	0 kg-m2
Static Analysis Horizontal Force Fh	441,560 N	FlyWheel Inertia	0 kg-m2
Calculated HoldBack Torque	N/A Nm	Gearbox Inertia HSS	1.88433 kg-m2
HoldBack Required (Yes/No) Fv>Fh/2	No	Total Drive Inertia	1200 kg-m2
HoldBack Req Torque 3x Motor FLT	249,618 Nm	Total Drive Equivalent Mass	512,436 kg
HoldBack Make	Not Installed		
HoldBack Model			
HoldBack Rated Torque	0 Nm		

[illegible]

Helix Technologies Pty Ltd

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

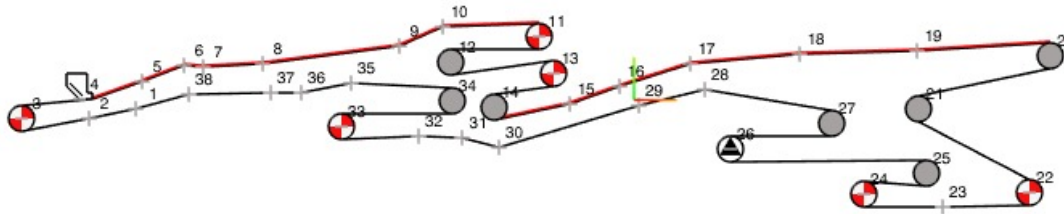
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland

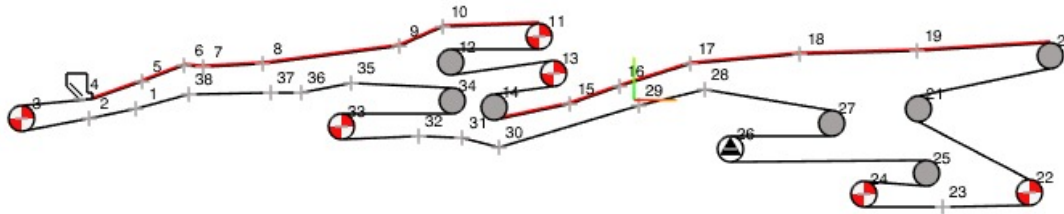


Drive Number	6	Drive	Pulley Number	3
Drive Description		Brake	Total Motor Power on Drive	0 kW
Number of Motors on Drive Pulley		1	Absorbed Power at Pulley	0 kW
Motor Category		Asea 3300V	Drive Efficiency	94 %
Motor Description		Brake only	Absorbed Power at Motor	0 kW
Motor Power Rating		0 kW	Motor Full Load Speed	0 rpm
Motor Voltage		415 V	Motor Full Load Torque	0 Nm
Number of Poles		4	Motor Full Load Current	0 Amps
Motor Frame Size		No Selection	Motor Efficiency at Duty Point	999 %
Motor Shaft Diameter		0 mm	Motor Power Factor at Duty Point	999
Motor Shaft Height		0 mm	Mass of Motor	0 kg
Motor Inertia		0.00 kgm2	Selection Mode	Manual
Drive Number	1	Drive	Pulley Number	11
Drive Description		Tripper	Total Motor Power on Drive	1000 kW
Number of Motors on Drive Pulley		1	Absorbed Power at Pulley	892.95 kW
Motor Category		Asea 3300V	Drive Efficiency	94 %
Motor Description		ASEA MBR 3300V Motor	Absorbed Power at Motor	949.95 kW
Motor Power Rating		1000 kW	Motor Full Load Speed	1480 rpm
Motor Voltage		3300 V	Motor Full Load Torque	6500 Nm
Number of Poles		4	Motor Full Load Current	210 Amps
Motor Frame Size		500 M	Motor Efficiency at Duty Point	92.88 %
Motor Shaft Diameter		120 mm	Motor Power Factor at Duty Point	0.88
Motor Shaft Height		500 mm	Mass of Motor	0 kg
Motor Inertia		0.00 kgm2	Selection Mode	Manual
Drive Number	2	Drive	Pulley Number	13
Drive Description		Tripper	Total Motor Power on Drive	1000 kW
Number of Motors on Drive Pulley		1	Absorbed Power at Pulley	892.95 kW
Motor Category		Asea 3300V	Drive Efficiency	94 %
Motor Description		ASEA MBR 3300V Motor	Absorbed Power at Motor	949.95 kW
Motor Power Rating		1000 kW	Motor Full Load Speed	1480 rpm
Motor Voltage		3300 V	Motor Full Load Torque	6500 Nm
Number of Poles		4	Motor Full Load Current	210 Amps
Motor Frame Size		500 M	Motor Efficiency at Duty Point	92.88 %
Motor Shaft Diameter		120 mm	Motor Power Factor at Duty Point	0.88
Motor Shaft Height		500 mm	Mass of Motor	0 kg
Motor Inertia		0.00 kgm2	Selection Mode	Manual

Project Demo 12 Curragh North Overland Client
 Project No. Prepared By P Burrow
 Conveyor No. C3 Overland Design Date 01 Oct 2019



C3 Overland



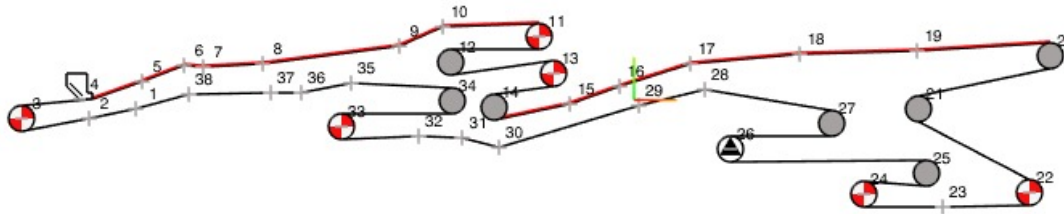
Drive Number	6	Drive	Pulley Number	3
Drive Description		Brake	Coupling Size	
Number of Motors on Drive Pulley		1	Motor Power Rating	0 kW
Selection Mode		Auto	Motor Full Load Speed	0 rpm
Coupling Category		Voith	Coupling Rated Slip	0 %
Coupling Description		No Selection - Direct Drive	Peak Torque	0 % FLT
Coupling Size			Run-up Torque % (2 sec)	0 % FLT
Coupling Power Rating		0 kW	Coupling Output Speed	0 rpm
Min Required Ramping Time		0.00 s	Mass of Coupling	0 kg
Max Starting Time		0 s		
Drive Number	1	Drive	Pulley Number	11
Drive Description		Tripper	Coupling Size	
Number of Motors on Drive Pulley		1	Motor Power Rating	1000 kW
Selection Mode		Auto	Motor Full Load Speed	1480 rpm
Coupling Category		Voith	Coupling Rated Slip	0 %
Coupling Description		No Selection - Direct Drive	Peak Torque	0 % FLT
Coupling Size			Run-up Torque % (2 sec)	0 % FLT
Coupling Power Rating		0 kW	Coupling Output Speed	1480 rpm
Min Required Ramping Time		0.00 s	Mass of Coupling	0 kg
Max Starting Time		0 s		
Drive Number	2	Drive	Pulley Number	13
Drive Description		Tripper	Coupling Size	
Number of Motors on Drive Pulley		1	Motor Power Rating	1000 kW
Selection Mode		Auto	Motor Full Load Speed	1480 rpm
Coupling Category		Voith	Coupling Rated Slip	0 %
Coupling Description		No Selection - Direct Drive	Peak Torque	0 % FLT
Coupling Size			Run-up Torque % (2 sec)	0 % FLT
Coupling Power Rating		0 kW	Coupling Output Speed	1480 rpm
Min Required Ramping Time		0.00 s	Mass of Coupling	0 kg
Max Starting Time		0 s		

Project	Demo 12 Curragh North Overland		Client		
Project No.			Prepared By	P Burrow	
Conveyor No.	C3 Overland		Design Date	01 Oct 2019	
Drive Number	3	Drive	Pulley Number	22	
Drive Description	Return		Coupling Size		
Number of Motors on Drive Pulley	1		Motor Power Rating	1000 kW	
Selection Mode	Auto		Motor Full Load Speed	1480 rpm	
Coupling Category	Voith		Coupling Rated Slip	0 %	
Coupling Description	No Selection - Direct Drive		Peak Torque	0 % FLT	
Coupling Size			Run-up Torque % (2 sec)	0 % FLT	
Coupling Power Rating	0 kW		Coupling Output Speed	1480 rpm	
Min Required Ramping Time	0.00 s		Mass of Coupling	0 kg	
Max Starting Time	0 s				
Drive Number	4	Drive	Pulley Number	24	
Drive Description	Return		Coupling Size		
Number of Motors on Drive Pulley	1		Motor Power Rating	1000 kW	
Selection Mode	Auto		Motor Full Load Speed	1480 rpm	
Coupling Category	Voith		Coupling Rated Slip	0 %	
Coupling Description	No Selection - Direct Drive		Peak Torque	0 % FLT	
Coupling Size			Run-up Torque % (2 sec)	0 % FLT	
Coupling Power Rating	0 kW		Coupling Output Speed	1480 rpm	
Min Required Ramping Time	0.00 s		Mass of Coupling	0 kg	
Max Starting Time	0 s				
Drive Number	5	Drive	Pulley Number	33	
Drive Description	Return		Coupling Size		
Number of Motors on Drive Pulley	1		Motor Power Rating	250 kW	
Selection Mode	Auto		Motor Full Load Speed	1480 rpm	
Coupling Category	Voith		Coupling Rated Slip	0 %	
Coupling Description	No Selection - Direct Drive		Peak Torque	0 % FLT	
Coupling Size			Run-up Torque % (2 sec)	0 % FLT	
Coupling Power Rating	0 kW		Coupling Output Speed	1480 rpm	
Min Required Ramping Time	0.00 s		Mass of Coupling	0 kg	
Max Starting Time	0 s				


Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019



C3 Overland




Drive Number	6	Drive	Pulley Number	3
Drive Description		Brake	Motor Power Rating	0 kW
Number of Motors on Drive Pulley		1	Motor Full Load Speed	0 rpm
Selection Mode		Manual	Motor Torque @ FL Speed	NaN Nm
Gearbox Category	Flender		Motor Torque at Pulley Speed	NaN Nm
Description	Brake only		Gearbox Rated Torque	0 Nm
Type			Service Factor Required	1.5
Size			Service Factor Calculated	NaN
Code				
Ratio		0	Plus Speed Selection Tolerance	5 %
Number of Stages		1	Minus Speed Selection Tolerance	5 %
			Fluid Coupling Slip	0 %
Design Efficiency (input)		94 %	Required Gearbox Ratio	0 :1
Gearbox actual Efficiency		0 %	Selected Gearbox Ratio	0 :1
Maximum Input Shaft Speed		0 rpm	Required Pulley Speed	NaN rpm
Minimum Input Shaft Speed		0 rpm	Calculated Pulley Speed for Reducer	0 rpm
Input Shaft Diameter		0 mm	Required Belt Speed	7.5 m/s
Output Shaft Diameter		0 mm	Calculated Belt Speed	0 m/s
Gearbox Inertia		0 kg/m2	Mass of Gearbox	0 kg


Project	Demo 12 Curragh North Overland		Client	
Project No.			Prepared By	P Burrow
Conveyor No.	C3 Overland		Design Date	01 Oct 2019
Drive Number	1	Drive	Pulley Number	11
Drive Description	Tripper		Motor Power Rating	1000 kW
Number of Motors on Drive Pulley	1		Motor Full Load Speed	1480 rpm
Selection Mode	Auto		Motor Torque @ FL Speed	6453 Nm
Gearbox Category	Flender		Motor Torque at Pulley Speed	83210 Nm
Description	Flender Helical Bevel Gear		Gearbox Rated Torque	134000 Nm
Type	Helical Bevel Gear		Service Factor Required	1.5
Size	16		Service Factor Calculated	1.61
Code	B2SH16			
Ratio	12.5		Plus Speed Selection Tolerance	10 %
Number of Stages	2		Minus Speed Selection Tolerance	10 %
			Fluid Coupling Slip	0 %
Design Efficiency (input)	94 %		Required Gearbox Ratio	12.895 :1
Gearbox actual Efficiency	94 %		Selected Gearbox Ratio	12.5 :1
Maximum Input Shaft Speed	1500 rpm		Required Pulley Speed	114.77 rpm
Minimum Input Shaft Speed	700 rpm		Calculated Pulley Speed for Reducer	118.4 rpm
Input Shaft Diameter	130 mm		Required Belt Speed	7.5 m/s
Output Shaft Diameter	220 mm		Calculated Belt Speed	7.74 m/s
Gearbox Inertia	1.88433 kg/m2		Mass of Gearbox	4160 kg
Drive Number	2	Drive	Pulley Number	13
Drive Description	Tripper		Motor Power Rating	1000 kW
Number of Motors on Drive Pulley	1		Motor Full Load Speed	1480 rpm
Selection Mode	Auto		Motor Torque @ FL Speed	6453 Nm
Gearbox Category	Flender		Motor Torque at Pulley Speed	83210 Nm
Description	Flender Helical Bevel Gear		Gearbox Rated Torque	134000 Nm
Type	Helical Bevel Gear		Service Factor Required	1.5
Size	16		Service Factor Calculated	1.61
Code	B2SH16			
Ratio	12.5		Plus Speed Selection Tolerance	10 %
Number of Stages	2		Minus Speed Selection Tolerance	10 %
			Fluid Coupling Slip	0 %
Design Efficiency (input)	94 %		Required Gearbox Ratio	12.895 :1
Gearbox actual Efficiency	94 %		Selected Gearbox Ratio	12.5 :1
Maximum Input Shaft Speed	1500 rpm		Required Pulley Speed	114.77 rpm
Minimum Input Shaft Speed	700 rpm		Calculated Pulley Speed for Reducer	118.4 rpm
Input Shaft Diameter	130 mm		Required Belt Speed	7.5 m/s
Output Shaft Diameter	220 mm		Calculated Belt Speed	7.74 m/s
Gearbox Inertia	1.88433 kg/m2		Mass of Gearbox	4160 kg
Helix DeltaT Conveyor Design program version: 1.0.7 www.helixconveyor.com				
				

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019
Drive Number	3	Drive	Pulley Number
Drive Description	Return	Motor Power Rating	1000 kW
Number of Motors on Drive Pulley	1	Motor Full Load Speed	1480 rpm
Selection Mode	Auto	Motor Torque @ FL Speed	6453 Nm
Gearbox Category	Flender	Motor Torque at Pulley Speed	83210 Nm
Description	Flender Helical Bevel Gear	Gearbox Rated Torque	134000 Nm
Type	Helical Bevel Gear	Service Factor Required	1.5
Size	16	Service Factor Calculated	1.61
Code	B2SH16		
Ratio	12.5	Plus Speed Selection Tolerance	10 %
Number of Stages	2	Minus Speed Selection Tolerance	10 %
		Fluid Coupling Slip	0 %
Design Efficiency (input)	94 %	Required Gearbox Ratio	12.895 :1
Gearbox actual Efficiency	94 %	Selected Gearbox Ratio	12.5 :1
Maximum Input Shaft Speed	1500 rpm	Required Pulley Speed	114.77 rpm
Minimum Input Shaft Speed	700 rpm	Calculated Pulley Speed for Reducer	118.4 rpm
Input Shaft Diameter	130 mm	Required Belt Speed	7.5 m/s
Output Shaft Diameter	220 mm	Calculated Belt Speed	7.74 m/s
Gearbox Inertia	1.88433 kg/m2	Mass of Gearbox	4160 kg
Drive Number	4	Drive	Pulley Number
Drive Description	Return	Motor Power Rating	1000 kW
Number of Motors on Drive Pulley	1	Motor Full Load Speed	1480 rpm
Selection Mode	Auto	Motor Torque @ FL Speed	6453 Nm
Gearbox Category	Flender	Motor Torque at Pulley Speed	83210 Nm
Description	Flender Helical Bevel Gear	Gearbox Rated Torque	134000 Nm
Type	Helical Bevel Gear	Service Factor Required	1.5
Size	16	Service Factor Calculated	1.61
Code	B2SH16		
Ratio	12.5	Plus Speed Selection Tolerance	10 %
Number of Stages	2	Minus Speed Selection Tolerance	10 %
		Fluid Coupling Slip	0 %
Design Efficiency (input)	94 %	Required Gearbox Ratio	12.895 :1
Gearbox actual Efficiency	94 %	Selected Gearbox Ratio	12.5 :1
Maximum Input Shaft Speed	1500 rpm	Required Pulley Speed	114.77 rpm
Minimum Input Shaft Speed	700 rpm	Calculated Pulley Speed for Reducer	118.4 rpm
Input Shaft Diameter	130 mm	Required Belt Speed	7.5 m/s
Output Shaft Diameter	220 mm	Calculated Belt Speed	7.74 m/s
Gearbox Inertia	1.88433 kg/m2	Mass of Gearbox	4160 kg

Helix DeltaT Conveyor Design program version: 1.0.7

www.helixconveyor.com

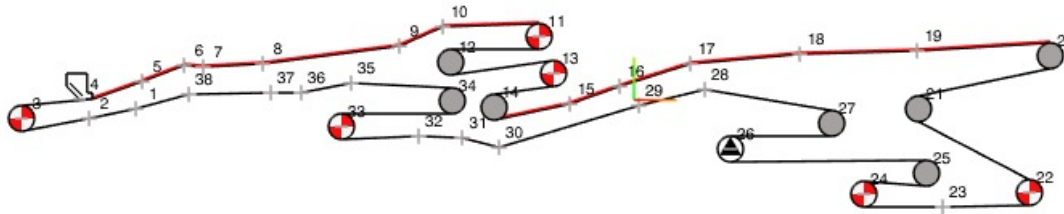


Project	Demo 12 Curragh North Overland	Client
Project No.		Prepared By P Burrow
Conveyor No.	C3 Overland	Design Date 01 Oct 2019
Drive Number	5 Drive	Pulley Number 33
Drive Description	Return	Motor Power Rating 250 kW
Number of Motors on Drive Pulley	1	Motor Full Load Speed 1480 rpm
Selection Mode	Auto	Motor Torque @ FL Speed 1613 Nm
Gearbox Category	Flender	Motor Torque at Pulley Speed 17951 Nm
Description	Flender Helical Bevel Gear	Gearbox Rated Torque 31900 Nm
Type	Helical Bevel Gear	Service Factor Required 1.5
Size	10	Service Factor Calculated 1.78
Code	B2SH10	
Ratio	11.2	Plus Speed Selection Tolerance 10 %
Number of Stages	2	Minus Speed Selection Tolerance 10 %
		Fluid Coupling Slip 0 %
Design Efficiency (input)	94 %	Required Gearbox Ratio 11.128 :1
Gearbox actual Efficiency	94 %	Selected Gearbox Ratio 11.2 :1
Maximum Input Shaft Speed	1500 rpm	Required Pulley Speed 133 rpm
Minimum Input Shaft Speed	700 rpm	Calculated Pulley Speed for Reducer 132.14 rpm
Input Shaft Diameter	80 mm	Required Belt Speed 7.5 m/s
Output Shaft Diameter	140 mm	Calculated Belt Speed 7.45 m/s
Gearbox Inertia	0.18973 kg/m2	Mass of Gearbox 1155 kg
Helix DeltaT Conveyor Design program version: 1.0.7 www.helixconveyor.com		
		

Project Demo 12 Curragh North Overland Client
 Project No. Prepared By P Burrow
 Conveyor No. C3 Overland Design Date 01 Oct 2019



C3 Overland



Drive Number	6	Drive	Pulley Number	3
Drive Description	Brake		Brake Location	High Speed
Load Share on Drive Pulley	0 %		Disc Material	Mild Steel
Brake Category			Disc Diameter	700 mm
Brake Description	No Brake on Drive		Disc Thickness	30 mm
Caliper	No Selection		Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley	1			
Selection Mode	No Brake on Drive			
Brake Selection Input Data			Caliper Clamping Force Minimum	9999 N
Low Speed Brake Torque Input	40.7 kNm		Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque	0 Nm		Pad Offset Width W	60 mm
Design Braking Torque Input	800 Nm		Air Gap	1 mm
Selected Brake's Torque Rating	2560 Nm		Recomended working airgap is 1mm	
Design Stopping Time	10 sec		Disc Initial Speed	1450 rpm
Consecutive number of Stops	3		Disc Moment of Inertia	5.55 kgm2
Average number of Stops per hour	3		Required Gearbox Ratio	0 :1
Ambient Temperature	30 deg C		Drive Efficiency	94 %
Disc Temp after stops	98 deg C		Mass of Caliper	0 kg
Drive Number	1	Drive	Pulley Number	11
Drive Description	Tripper		Brake Location	High Speed
Load Share on Drive Pulley	23.5 %		Disc Material	Mild Steel
Brake Category			Disc Diameter	700 mm
Brake Description	No Brake on Drive		Disc Thickness	30 mm
Caliper	No Selection		Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley	1			
Selection Mode	No Brake on Drive			
Brake Selection Input Data			Caliper Clamping Force Minimum	9999 N
Low Speed Brake Torque Input	0 kNm		Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque	0 Nm		Pad Offset Width W	60 mm
Design Braking Torque Input	800 Nm		Air Gap	1 mm
Selected Brake's Torque Rating	2560 Nm		Recomended working airgap is 1mm	
Design Stopping Time	10 sec		Disc Initial Speed	1450 rpm
Consecutive number of Stops	3		Disc Moment of Inertia	5.55 kgm2
Average number of Stops per hour	3		Required Gearbox Ratio	12.895 :1
Ambient Temperature	30 deg C		Drive Efficiency	94 %
Disc Temp after stops	98 deg C		Mass of Caliper	0 kg

Helix Technologies Pty Ltd

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019

Drive Number	2	Drive	Pulley Number	13
--------------	---	-------	---------------	----

Drive Description	Tripper	Brake Location	High Speed
Load Share on Drive Pulley	23.5 %	Disc Material	Mild Steel
Brake Category		Disc Diameter	700 mm
Brake Description	No Brake on Drive	Disc Thickness	30 mm
Caliper	No Selection	Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley	1		
Selection Mode	No Brake on Drive		

Brake Selection Input Data

Low Speed Brake Torque Input	0 kNm	Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque	0 Nm	Pad Offset Width W	60 mm
Design Braking Torque Input	800 Nm	Air Gap	1 mm
Selected Brake's Torque Rating	2560 Nm	<i>Recomended working airgap is 1mm</i>	
<i>Design Stopping Time</i>	10 sec	Disc Initial Speed	1450 rpm
Consecutive number of Stops	3	Disc Moment of Inertia	5.55 kgm ²
Average number of Stops per hour	3	Required Gearbox Ratio	12.895 :1
Ambient Temperature	30 deg C	Drive Efficiency	94 %
Disc Temp after stops	98 deg C	Mass of Caliper	0 kg

Drive Number	3	Drive	Pulley Number	22
--------------	---	-------	---------------	----

Drive Description	Return	Brake Location	High Speed
Load Share on Drive Pulley	23.5 %	Disc Material	Mild Steel
Brake Category		Disc Diameter	700 mm
Brake Description	No Brake on Drive	Disc Thickness	30 mm
Caliper	No Selection	Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley	1		
Selection Mode	No Brake on Drive		

Brake Selection Input Data

Low Speed Brake Torque Input	40.7 kNm	Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque	0 Nm	Pad Offset Width W	60 mm
Design Braking Torque Input	800 Nm	Air Gap	1 mm
Selected Brake's Torque Rating	2560 Nm	Recomended working airgap is 1mm	
Design Stopping Time	10 sec	Disc Initial Speed	1450 rpm
Consecutive number of Stops	3	Disc Moment of Inertia	5.55 kgm2
Average number of Stops per hour	3	Required Gearbox Ratio	12.895 :1
Ambient Temperature	30 deg C	Drive Efficiency	94 %
Disc Temp after stops	98 deg C	Mass of Caliper	0 kg

Helix Technologies Pty Ltd

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019

Drive Number	4	Drive	Pulley Number	24
Drive Description		Return	Brake Location	High Speed
Load Share on Drive Pulley		23.5 %	Disc Material	Mild Steel
Brake Category			Disc Diameter	700 mm
Brake Description	No Brake on Drive		Disc Thickness	30 mm
Caliper	No Selection		Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley		1		
Selection Mode	No Brake on Drive			

Brake Selection Input Data

Low Speed Brake Torque Input	40.7 kNm	Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque	0 Nm	Pad Offset Width W	60 mm
Design Braking Torque Input	800 Nm	Air Gap	1 mm
Selected Brake's Torque Rating	2560 Nm	Recomended working airgap is 1mm	
Design Stopping Time	10 sec	Disc Initial Speed	1450 rpm
Consecutive number of Stops	3	Disc Moment of Inertia	5.55 kgm2
Average number of Stops per hour	3	Required Gearbox Ratio	12.895 :1
Ambient Temperature	30 deg C	Drive Efficiency	94 %
Disc Temp after stops	98 deg C	Mass of Caliper	0 kg

Drive Number	5	Drive	Pulley Number	33
Drive Description		Return	Brake Location	High Speed
Load Share on Drive Pulley		6 %	Disc Material	Mild Steel
Brake Category			Disc Diameter	700 mm
Brake Description	No Brake on Drive		Disc Thickness	30 mm
Caliper	No Selection		Co-eff of Friction (Pad-Disc)	0.4
Number of Motors on Drive Pulley		1		
Selection Mode	No Brake on Drive			

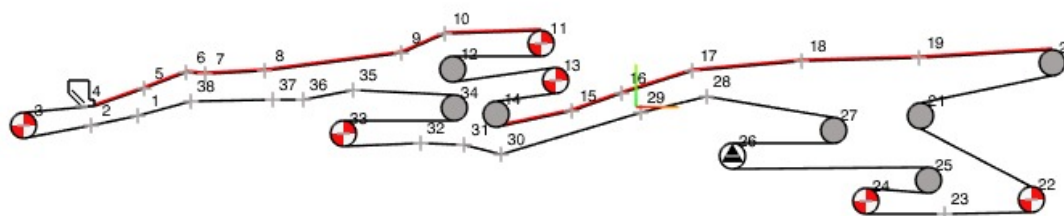
Brake Selection Input Data

Low Speed Brake Torque Input	0 kNm	Caliper Clamping Force Maximum	0 N
Equivalent HS Brake Torque	0 Nm	Pad Offset Width W	60 mm
Design Braking Torque Input	800 Nm	Air Gap	1 mm
Selected Brake's Torque Rating	2560 Nm	<i>Recomended working airgap is 1mm</i>	
<i>Design Stopping Time</i>	10 sec	Disc Initial Speed	1450 rpm
Consecutive number of Stops	3	Disc Moment of Inertia	5.55 kgm ²
Average number of Stops per hour	3	Required Gearbox Ratio	11.128 :1
Ambient Temperature	30 deg C	Drive Efficiency	94 %
Disc Temp after stops	98 deg C	Mass of Caliper	0 kg


Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019





G3 Overland




Drive Number	6	Drive	Pulley Number	3
Drive Description		Brake	Motor Power Rating	0 kW
Load Share on Drive Pulley		0 %	Motor Full Load Speed	0 rpm
Starting Torque Factor Fully Loaded		100 %	Motor Torque at Full Load Speed	Nm
Starting Torque Factor Empty		100 %	Motor Torque at Pulley Speed	Nm
Number of Motors on Drive Pulley		1	Pulley Shaft Diameter at Brg	200 mm
Drive Efficiency		94 %		
High Speed Coupling			Low Speed Coupling	
HS Coupling Category		Falk SteelFlex Grid	LS Coupling Category	Falk SteelFlex Grid
HS Coupling Make		Falk	LS Coupling Make	Falk
HS Coupling Model		1020T	LS Coupling Model	1140T
Coupling Type		Grid	Coupling Type	Grid
Coupling Torque Rating		52 Nm	Coupling Torque Rating	28600 Nm
Service Factor Required		1.5	Service Factor Required	1.5
Service Factor Calculated			Service Factor Calculated	
Maximum Shaft Bore		28 mm	Maximum Shaft Bore	200 mm
Minimum Shaft Bore		0 mm	Minimum Shaft Bore	0 mm
Maximum Rotation Speed		4500 rpm	Maximum Rotation Speed	1650 rpm
High Speed Coupling Inertia		0.0014 kg-m2	Low Speed Coupling Inertia	1.85 kg-m2
Drawing Number			Drawing Number	
High Speed Coupling Mass		1.91 kg	Low Speed Coupling Mass	178 kg
High Speed Coupling Price		0	Low Speed Coupling Price	0
Fluid Coupling				
Direct Drive		Yes		
Fluid Coupling		No Selection - Direct Drive		
Fluid Coupling Size				

26 Jun 2020		Shaft Coupling Report		Page: 52/66	
Helix Technologies Pty Ltd					
Project Demo 12 Curragh North Overland		Client			
Project No.		Prepared By		P Burrow	
Conveyor No. C3 Overland		Design Date		01 Oct 2019	
Drive Number 1 Drive		Pulley Number 11			
Drive Description Tripper		Motor Power Rating		1000 kW	
Load Share on Drive Pulley 23.5 %		Motor Full Load Speed		1480 rpm	
Starting Torque Factor Fully Loaded 110 %		Motor Torque at Full Load Speed		6453 Nm	
Starting Torque Factor Empty 50 %		Motor Torque at Pulley Speed		83210 Nm	
Number of Motors on Drive Pulley 1		Pulley Shaft Diameter at Brg		280 mm	
Drive Efficiency 94 %					
High Speed Coupling			Low Speed Coupling		
HS Coupling Category Falk SteelFlex Grid			LS Coupling Category Falk SteelFlex Grid		
HS Coupling Make Falk			LS Coupling Make Falk		
HS Coupling Model 1140T			LS Coupling Model 1220T		
Coupling Type Grid			Coupling Type Grid		
Coupling Torque Rating 28600 Nm			Coupling Torque Rating 336000 Nm		
Service Factor Required 1.5			Service Factor Required 1.5		
Service Factor Calculated 4.43			Service Factor Calculated 4.04		
Maximum Shaft Bore 200 mm			Maximum Shaft Bore 420 mm		
Minimum Shaft Bore 0 mm			Minimum Shaft Bore 0 mm		
Maximum Rotation Speed 1650 rpm			Maximum Rotation Speed 730 rpm		
High Speed Coupling Inertia 1.85 kg-m2			Low Speed Coupling Inertia 113 kg-m2		
Drawing Number			Drawing Number		
High Speed Coupling Mass 178 kg			Low Speed Coupling Mass 1785 kg		
High Speed Coupling Price 0			Low Speed Coupling Price 0		
Fluid Coupling					
Direct Drive Yes					
Fluid Coupling No Selection - Direct Drive					
Fluid Coupling Size					
<div> <div>Helix DeltaT Conveyor Design program version: 1.0.7</div> <div>www.helixconveyor.com</div> </div> <div>  </div>					

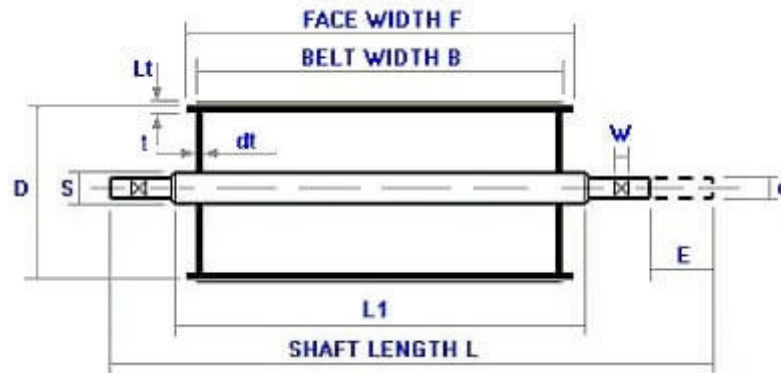
26 Jun 2020		Shaft Coupling Report		Page: 53/66	
Helix Technologies Pty Ltd					
Project Demo 12 Curragh North Overland		Client			
Project No.		Prepared By		P Burrow	
Conveyor No. C3 Overland		Design Date		01 Oct 2019	
Drive Number 2 Drive		Pulley Number 13			
Drive Description Tripper		Motor Power Rating		1000 kW	
Load Share on Drive Pulley 23.5 %		Motor Full Load Speed		1480 rpm	
Starting Torque Factor Fully Loaded 110 %		Motor Torque at Full Load Speed		6453 Nm	
Starting Torque Factor Empty 50 %		Motor Torque at Pulley Speed		83210 Nm	
Number of Motors on Drive Pulley 1		Pulley Shaft Diameter at Brg		240 mm	
Drive Efficiency 94 %					
High Speed Coupling			Low Speed Coupling		
HS Coupling Category Falk SteelFlex Grid			LS Coupling Category Falk SteelFlex Grid		
HS Coupling Make Falk			LS Coupling Make Falk		
HS Coupling Model 1140T			LS Coupling Model 1220T		
Coupling Type Grid			Coupling Type Grid		
Coupling Torque Rating 28600 Nm			Coupling Torque Rating 336000 Nm		
Service Factor Required 1.5			Service Factor Required 1.5		
Service Factor Calculated 4.43			Service Factor Calculated 4.04		
Maximum Shaft Bore 200 mm			Maximum Shaft Bore 420 mm		
Minimum Shaft Bore 0 mm			Minimum Shaft Bore 0 mm		
Maximum Rotation Speed 1650 rpm			Maximum Rotation Speed 730 rpm		
High Speed Coupling Inertia 1.85 kg-m2			Low Speed Coupling Inertia 113 kg-m2		
Drawing Number			Drawing Number		
High Speed Coupling Mass 178 kg			Low Speed Coupling Mass 1785 kg		
High Speed Coupling Price 0			Low Speed Coupling Price 0		
Fluid Coupling					
Direct Drive Yes					
Fluid Coupling No Selection - Direct Drive					
Fluid Coupling Size					
<div> <div>Helix DeltaT Conveyor Design program version: 1.0.7</div> <div>www.helixconveyor.com</div> </div> <div>  </div>					

26 Jun 2020		Shaft Coupling Report		Page: 54/66	
Helix Technologies Pty Ltd					
Project		Demo 12 Curragh North Overland		Client	
Project No.				Prepared By P Burrow	
Conveyor No.		C3 Overland		Design Date 01 Oct 2019	
Drive Number		3		Drive	
Pulley Number		22			
Drive Description		Return		Motor Power Rating 1000 kW	
Load Share on Drive Pulley		23.5 %		Motor Full Load Speed 1480 rpm	
Starting Torque Factor Fully Loaded		110 %		Motor Torque at Full Load Speed 6453 Nm	
Starting Torque Factor Empty		50 %		Motor Torque at Pulley Speed 83210 Nm	
Number of Motors on Drive Pulley		1		Pulley Shaft Diameter at Brg 260 mm	
Drive Efficiency		94 %			
High Speed Coupling			Low Speed Coupling		
HS Coupling Category		Falk SteelFlex Grid		LS Coupling Category Falk SteelFlex Grid	
HS Coupling Make		Falk		LS Coupling Make Falk	
HS Coupling Model		1140T		LS Coupling Model 1220T	
Coupling Type		Grid		Coupling Type Grid	
Coupling Torque Rating		28600 Nm		Coupling Torque Rating 336000 Nm	
Service Factor Required		1.5		Service Factor Required 1.5	
Service Factor Calculated		4.43		Service Factor Calculated 4.04	
Maximum Shaft Bore		200 mm		Maximum Shaft Bore 420 mm	
Minimum Shaft Bore		0 mm		Minimum Shaft Bore 0 mm	
Maximum Rotation Speed		1650 rpm		Maximum Rotation Speed 730 rpm	
High Speed Coupling Inertia		1.85 kg-m2		Low Speed Coupling Inertia 113 kg-m2	
Drawing Number				Drawing Number	
High Speed Coupling Mass		178 kg		Low Speed Coupling Mass 1785 kg	
High Speed Coupling Price		0		Low Speed Coupling Price 0	
Fluid Coupling					
Direct Drive		Yes			
Fluid Coupling		No Selection - Direct Drive			
Fluid Coupling Size					
<div> <div>Helix DeltaT Conveyor Design program version: 1.0.7</div> <div>www.helixconveyor.com</div> </div> <div>  </div>					

Project	Demo 12 Curragh North Overland		Client		
Project No.			Prepared By	P Burrow	
Conveyor No.	C3 Overland		Design Date	01 Oct 2019	
Drive Number	4	Drive	Pulley Number	24	
Drive Description	Return		Motor Power Rating	1000 kW	
Load Share on Drive Pulley	23.5 %		Motor Full Load Speed	1480 rpm	
Starting Torque Factor Fully Loaded	110 %		Motor Torque at Full Load Speed	6453 Nm	
Starting Torque Factor Empty	50 %		Motor Torque at Pulley Speed	83210 Nm	
Number of Motors on Drive Pulley	1		Pulley Shaft Diameter at Brg	240 mm	
Drive Efficiency	94 %				
High Speed Coupling			Low Speed Coupling		
HS Coupling Category	Falk SteelFlex Grid		LS Coupling Category	Falk SteelFlex Grid	
HS Coupling Make	Falk		LS Coupling Make	Falk	
HS Coupling Model	1140T		LS Coupling Model	1220T	
Coupling Type	Grid		Coupling Type	Grid	
Coupling Torque Rating	28600 Nm		Coupling Torque Rating	336000 Nm	
Service Factor Required	1.5		Service Factor Required	1.5	
Service Factor Calculated	4.43		Service Factor Calculated	4.04	
Maximum Shaft Bore	200 mm		Maximum Shaft Bore	420 mm	
Minimum Shaft Bore	0 mm		Minimum Shaft Bore	0 mm	
Maximum Rotation Speed	1650 rpm		Maximum Rotation Speed	730 rpm	
High Speed Coupling Inertia	1.85 kg-m2		Low Speed Coupling Inertia	113 kg-m2	
Drawing Number			Drawing Number		
High Speed Coupling Mass	178 kg		Low Speed Coupling Mass	1785 kg	
High Speed Coupling Price	0		Low Speed Coupling Price	0	
Fluid Coupling					
Direct Drive	Yes				
Fluid Coupling	No Selection - Direct Drive				
Fluid Coupling Size					

26 Jun 2020		Shaft Coupling Report		Page: 56/66	
Helix Technologies Pty Ltd					
Project Demo 12 Curragh North Overland		Client			
Project No.		Prepared By		P Burrow	
Conveyor No. C3 Overland		Design Date		01 Oct 2019	
Drive Number 5 Drive		Pulley Number 33			
Drive Description		Return		Motor Power Rating 250 kW	
Load Share on Drive Pulley		6 %		Motor Full Load Speed 1480 rpm	
Starting Torque Factor Fully Loaded		110 %		Motor Torque at Full Load Speed 1613 Nm	
Starting Torque Factor Empty		50 %		Motor Torque at Pulley Speed 17951 Nm	
Number of Motors on Drive Pulley		1		Pulley Shaft Diameter at Brg 170 mm	
Drive Efficiency		94 %			
High Speed Coupling			Low Speed Coupling		
HS Coupling Category Falk SteelFlex Grid			LS Coupling Category Falk SteelFlex Grid		
HS Coupling Make Falk			LS Coupling Make Falk		
HS Coupling Model 1100 T35			LS Coupling Model 1170T		
Coupling Type Grid			Coupling Type Grid		
Coupling Torque Rating 6280 Nm			Coupling Torque Rating 74600 Nm		
Service Factor Required 1.5			Service Factor Required 1.5		
Service Factor Calculated 3.89			Service Factor Calculated 4.16		
Maximum Shaft Bore 110 mm			Maximum Shaft Bore 280 mm		
Minimum Shaft Bore 0 mm			Minimum Shaft Bore 0 mm		
Maximum Rotation Speed 2440 rpm			Maximum Rotation Speed 1225 rpm		
High Speed Coupling Inertia 0.346 kg-m2			Low Speed Coupling Inertia 10.4 kg-m2		
Drawing Number			Drawing Number		
High Speed Coupling Mass 66 kg			Low Speed Coupling Mass 448 kg		
High Speed Coupling Price 0			Low Speed Coupling Price 0		
Fluid Coupling					
Direct Drive Yes					
Fluid Coupling No Selection - Direct Drive					
Fluid Coupling Size					
<div> <div>Helix DeltaT Conveyor Design program version: 1.0.7</div> <div>www.helixconveyor.com</div> </div> <div>  </div>					

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019



Belt Width	1200 mm	Belt Class	ST 1500
------------	---------	------------	---------

<u>Station / Section</u>												
Station	Description	Shell Dia mm	Shell t mm	Calc Shell t mm	Lagging mm	OD mm	Face Width mm	Shaft Length mm	Shaft Dia mm	Brg Dia mm	Pulley & Shaft Mass kg	Mom of Inertia kgm2
3 Drive		1053	18	16.5	12	1077	1350	2400	200	200	1948	277.2
11 Drive		1224	25	27.6	12	1248	1350	2520	280	280	3602	626.3
12 Bend		900	22	24.6	12	924	1350	2460	240	240	2182	199.1
13 Drive		1224	25	20.9	12	1248	1350	2460	240	240	3278	620.6
14 Bend		900	22	16.6	12	924	1350	2400	200	200	1916	195.8
20 Head		1224	25	28.9	12	1248	1350	2460	260	260	3420	623.0
21 Bend		900	22	28.9	12	924	1350	2460	260	260	2325	201.5
22 Drive		1224	25	26	12	1248	1350	2460	260	260	3420	623.0
24 Drive		1224	25	18.6	12	1248	1350	2460	240	240	3278	620.6
25 Bend		900	22	13.3	12	924	1350	2280	170	150	1740	194.3
26 Takeup		1224	25	13.4	12	1248	1350	2180	160	140	2779	615.5
27 Bend		960	22	13.4	12	984	1350	2280	170	150	1660	220.1
33 Drive		1053	18	14.7	12	1077	1350	2340	200	170	1933	277.1
34 Bend		900	22	13.3	12	924	1350	2280	170	150	1740	194.3

* Indicates Manual pulley dimensions entered

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

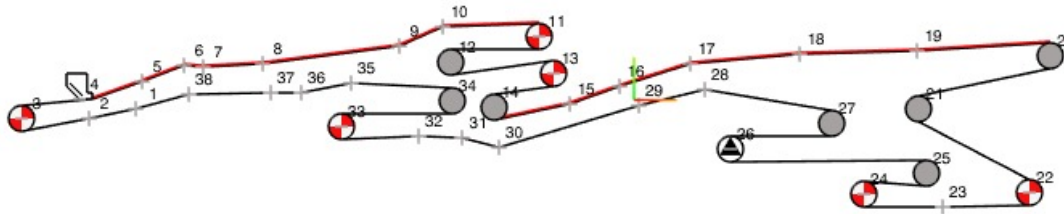
Conveyor No. C3 Overland

Design Date

01 Oct 2019



C3 Overland

**Station / Section**

Station	Description	Shell Dia mm	Lagging mm	Face Width mm	Brg Ctrs mm	Drive Power kW	Wrap Angle deg	Pulley Speed rpm	T1 Run kN	T2 Run kN	T1 Start kN	T2 Start kN
3 Drive	Tail Brake	1053	12	1350	1800	0	180.0	133.0	97.10	97.52	132.81	133.34
									Running Full		Starting Empty	
11 Drive	Tripper drv 1	1224	12	1350	1800	1000	180.0	114.8	331.91	213.94	367.9	231.89
									Running Full		Starting Full	
12 Bend		900	12	1350	1800		180.0	155.0	215.27	216.14	233.23	234.12
									Running Full		Starting Full	
13 Drive	Tripper Drv 2	1224	12	1350	1800	1000	180.0	114.8	215.94	97.52	233.93	97.28
									Running Full		Starting Full	
14 Bend		900	12	1350	1800		180.0	155.0	98.55	98.97	107.71	108.07
									Running Full		Coasting Empty	
20 Head		1224	12	1350	1800		180.0	114.8	298.72	299.91	318.16	319.38
									Running Full		Starting Full	
21 Bend		900	12	1350	1800		180.0	155.0	298.91	300.10	318.6	319.81
									Running Full		Starting Full	
22 Drive		1224	12	1350	1800	1000	180.0	114.8	300.51	182.42	320.23	192.25
									Running Full		Starting Full	
24 Drive		1224	12	1350	1800	1000	180.0	114.8	182.46	63.91	192.3	63.87
									Running Full		Starting Full	
25 Bend		900	12	1350	1800		180.0	155.0	63.62	63.91	71.2	71.39
									Running Full		Coasting Full	
26 Takeup		1224	12	1350	1800		90.0	114.8	63.74	64.04	63.74	64.09
									Running Full		Starting Empty	
27 Bend		960	12	1350	1800		180.0	145.6	63.78	64.07	63.84	64.16
									Running Full		Starting Empty	
33 Drive	Return Drv	1053	12	1350	1800	250	180.0	133.0	92.70	62.64	102.63	87.51
									Running Full		Starting Empty	
34 Bend		900	12	1350	1800		180.0	155.0	62.70	62.99	87.59	87.98
									Running Full		Starting Empty	

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

P Burrow

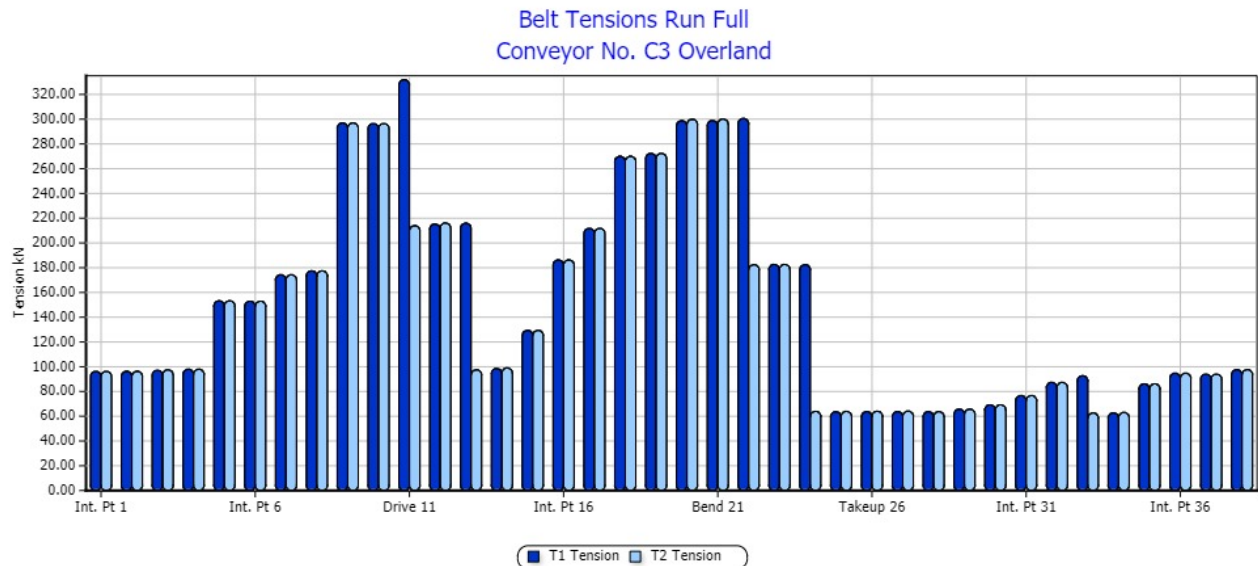
Conveyor No. C3 Overland

Design Date

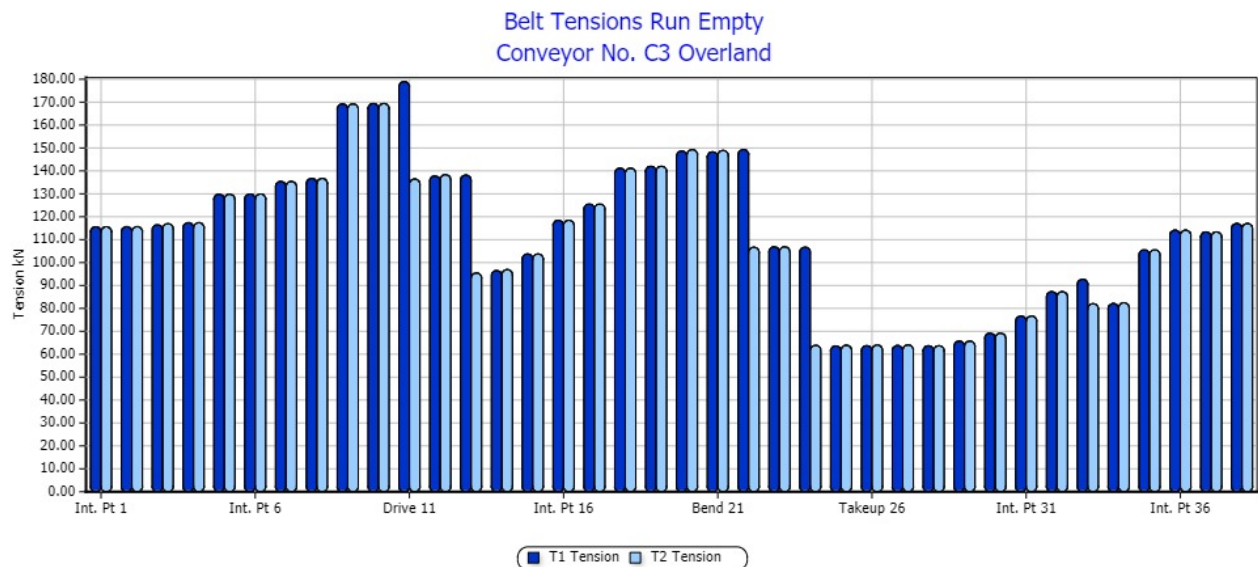
01 Oct 2019

Conveyor Tension Graphs

Calculation Method

Visco

Helix Technologies Pty Ltd



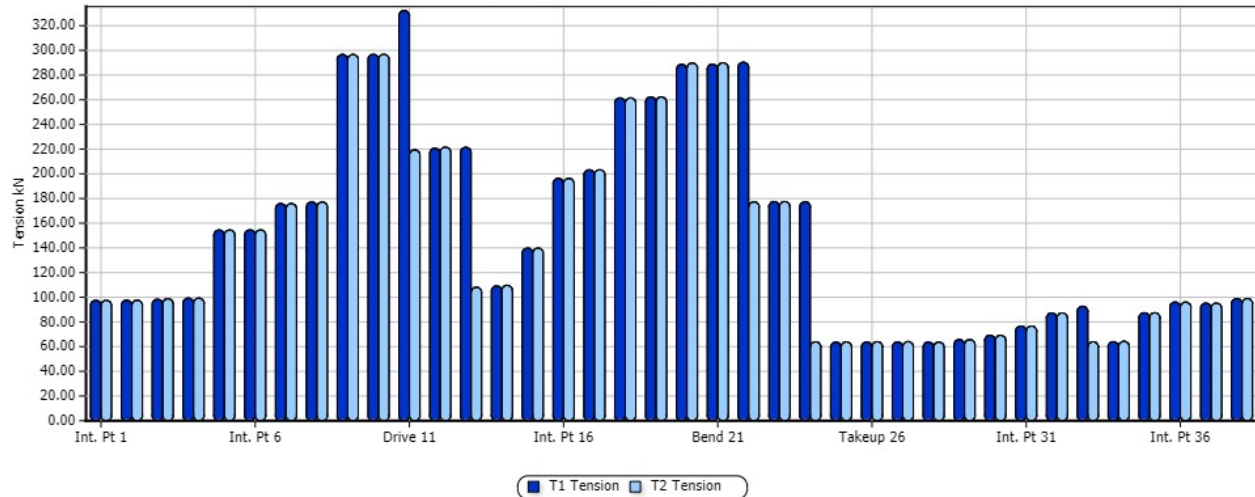
Helix Technologies Pty Ltd

Project Demo 12 Curragh North Overland Client

Project No. Prepared By P Burrow

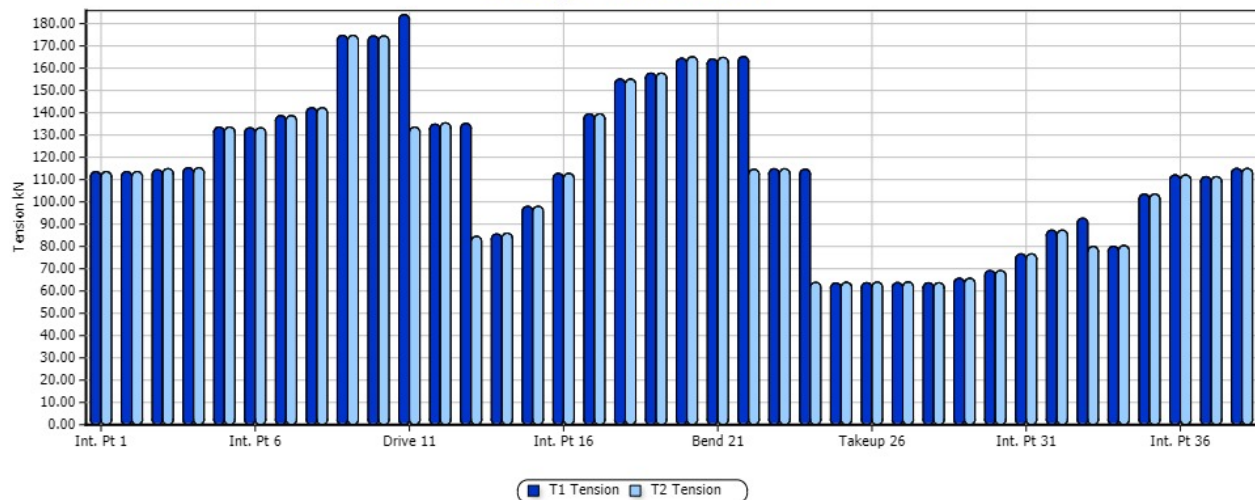
Conveyor No. C3 Overland Design Date 01 Oct 2019

Belt Tensions Run Inclines Loaded
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Belt Tensions Run Declines Loaded
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

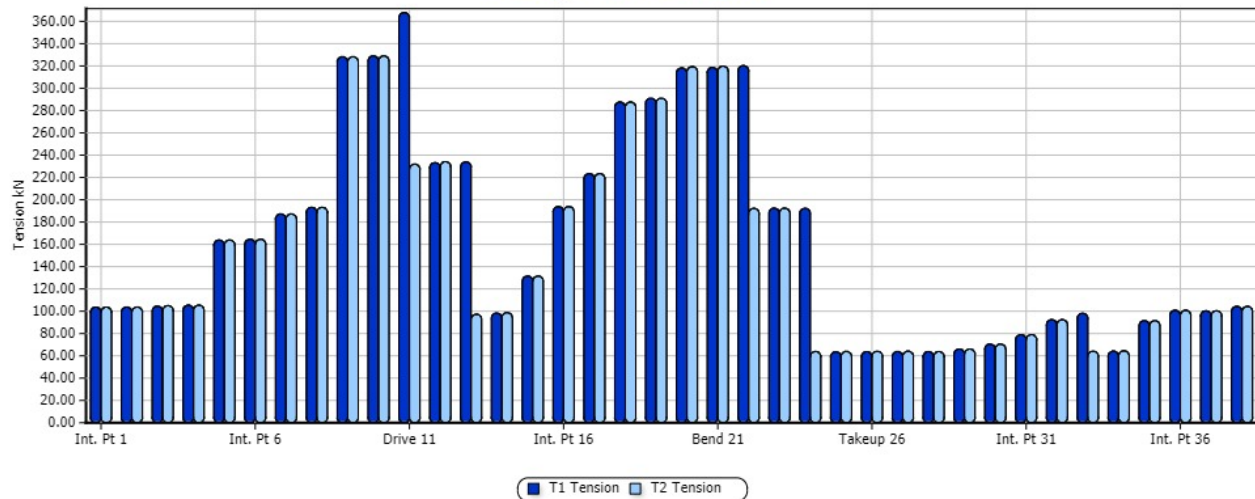
P Burrow

Conveyor No. C3 Overland

Design Date

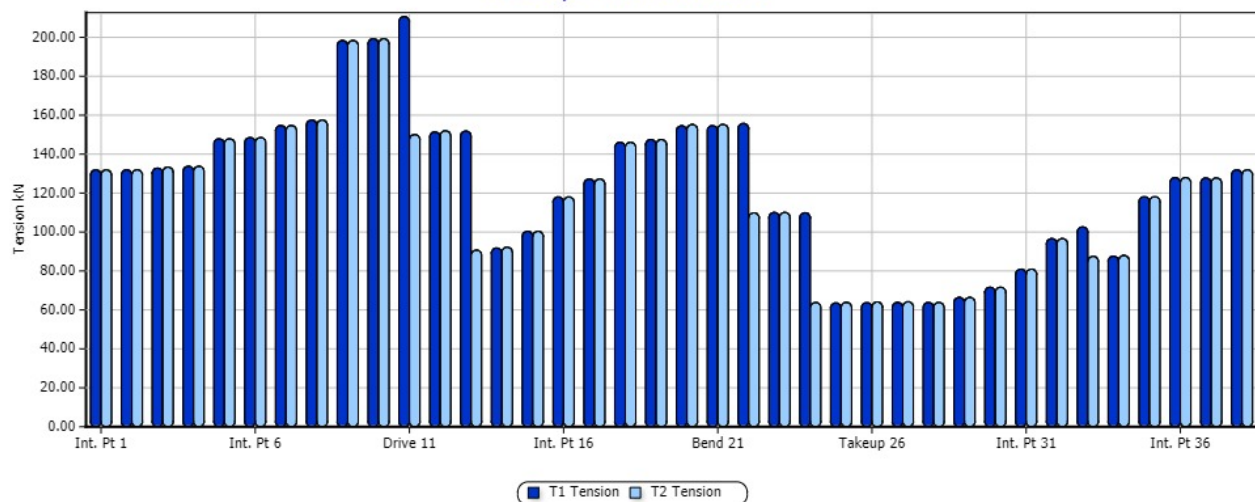
01 Oct 2019

Belt Tensions Starting Full
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Belt Tensions Starting Empty
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

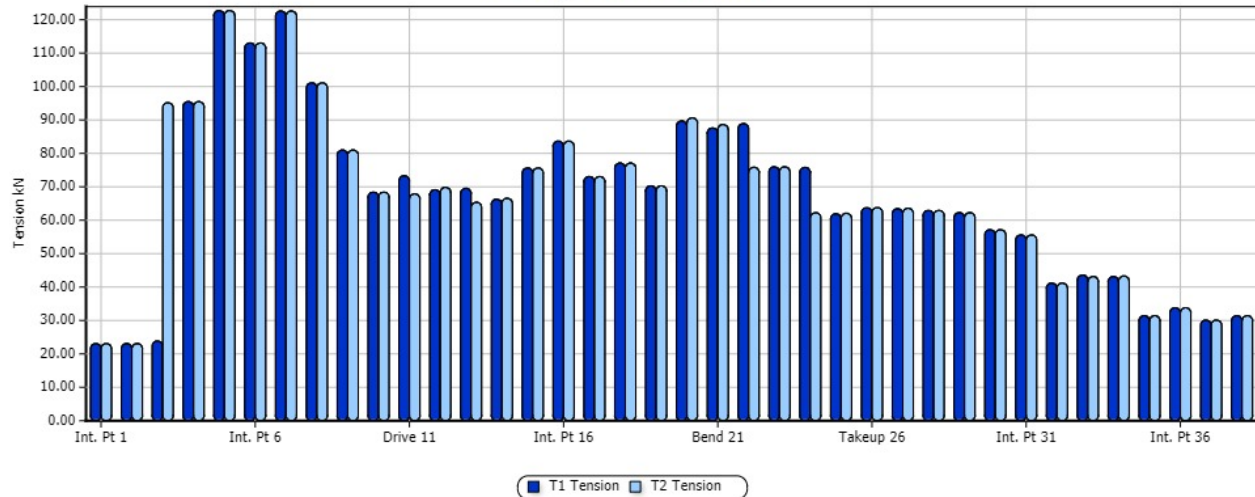
P Burrow

Conveyor No. C3 Overland

Design Date

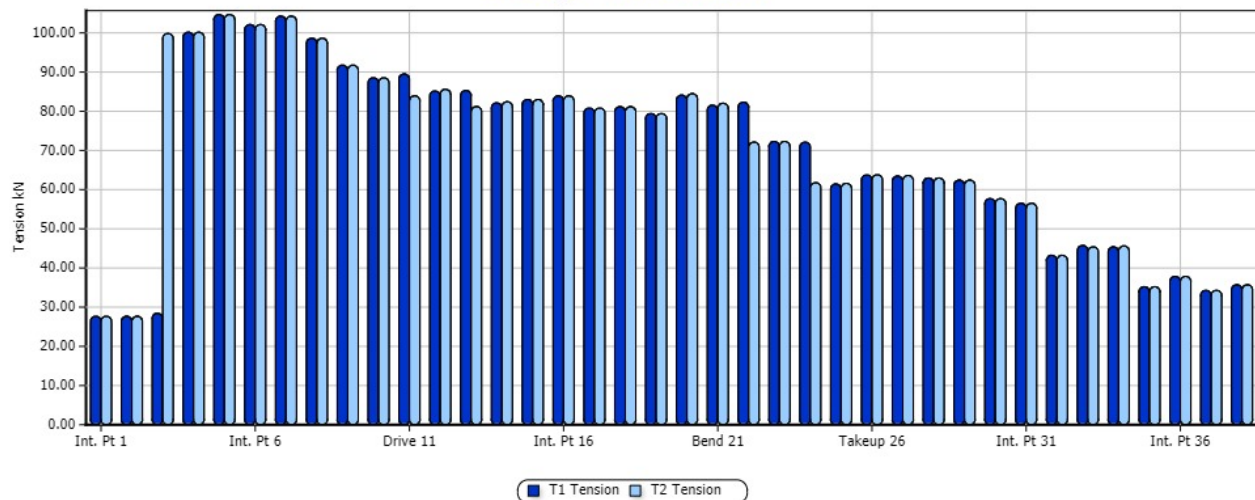
01 Oct 2019

Belt Tensions Stopping Braking Full
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Belt Tensions Stopping Braking Empty
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Project Demo 12 Curragh North Overland Client

Project No.

Prepared By

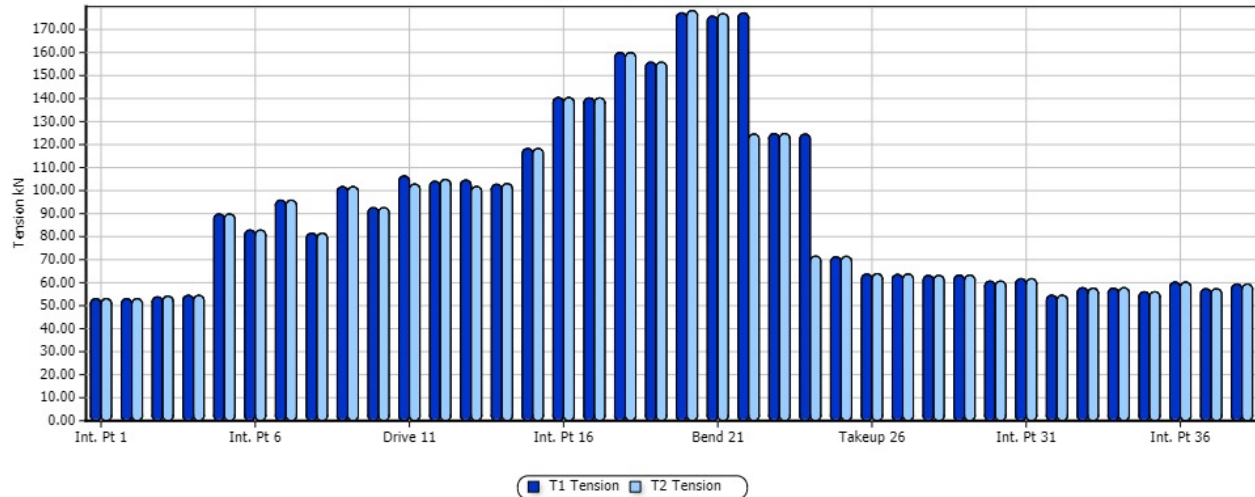
P Burrow

Conveyor No. C3 Overland

Design Date

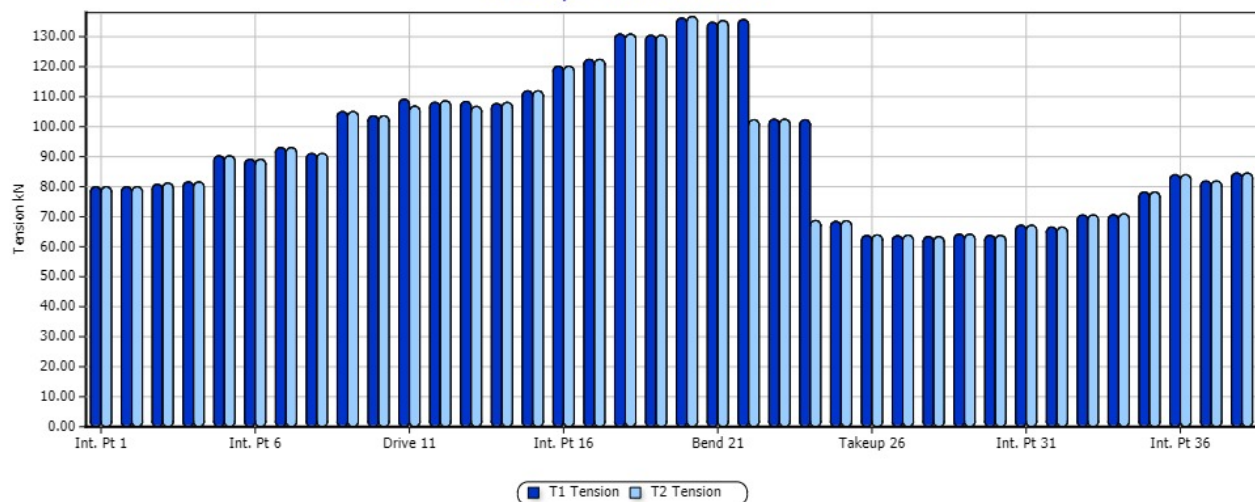
01 Oct 2019

Belt Tensions Stopping Coasting Full
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Belt Tensions Stopping Coasting Empty
Conveyor No. C3 Overland



Helix Technologies Pty Ltd

Project	Demo 12 Curragh North Overland	Client	
Project No.		Prepared By	P Burrow
Conveyor No.	C3 Overland	Design Date	01 Oct 2019

